MONTHLY WEATHER REVIEW.

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INTRODUCTION.

In this REVIEW are shown the general meteorological conditions which prevailed over the United States during May, 1883. The tracks of the storms which have occurred in the north Atlantic ocean during the month, are approximately shown on chart ii., and are described under the heading "North Atlantic Storms." On this chart are also shown the limits within which ice was observed in the north Atlantic ocean.

The following are the special meteorological features of the month:

1st.—The mean temperature, which has been below the normal in nearly all parts of the country; the departures being most marked in the extreme northwest, upper Mississippi and Missouri valleys, where they have averaged 6°.5. As a noteworthy feature, in this connection may be mentioned, that over a large extent of country where marked departures below the normal temperature have occurred, the mean atmospheric pressure has also been below the normal.

2d.—The large excess over the average rainfall in the lower lake region, Missouri valley, south Atlantic states, and in California. In the latter state the rainfall for the month has been more than four times as great as the average for May.

3d.—The violent and destructive local storms which occurred on the 13th, in Kansas and Missouri; and on the 18th, in Wisconsin, Illinois and Indiana.

4th.—The heavy frosts which occurred on the 22d, in the western states, resulting in serious injury to various kinds of vegetation, especially in the states of Illinois and Missouri.

In the preparation of this REVIEW, the following data, received up to June 20th, have been used; viz.: the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and thirty-one Signal Service stations and fourteen Canadian stations, as telegraphed to this office; one hundred and sixty-nine monthly journals, and one hundred and sixty-eight monthly means from the former, and fourteen monthly means from the latter; two hundred and thirty-three monthly registers from voluntary observers; fifty monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports, through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly weather reports from the local weather services of Illinois, Indiana, Iowa, Nebraska, New Jersey and Tennessee, and of the Central Pacific railway company; trustworthy newspaper extracts; and special reports.

BAROMETRIC PRESSURE.

[*Expressed in inches and hundredths.*]

The distribution of mean atmospheric pressure for the month of May, 1883, determined from the tri-daily telegraphic observations of the Signal Service, is shown by the isobarometric lines, in red, on chart iii.

The area of least mean pressure is inclosed by the isobar of 29.85 and occupies about the same position as that of the preceding month. It is, however, more extended than the low area of April, and embraces a region stretching southwestward from southeastern Wyoming, and the western portions of Nebraska and Kansas, to beyond the limits of the Signal-Service stations.

The regions of greatest mean pressure are the north Pacific coast region; along the immediate California coast; over the south Atlantic and east Gulf states, and in eastern Nova Scotia. In these districts the monthly barometric means exceed 30.0, the maximum mean pressure for the month occurring over the south Atlantic and east Gulf states, and in the north Pacific coast region. The mean pressure of May, compared with that of April, shows an increase over the northern plateau and north Pacific coast regions, varying from .01 to 04. The pressure is also greater in Nova Scotia, the Gulf states, Tennessee, and in the lower Missouri valley. In these districts the increase is generally less than .05, the only exceptions being .06 at Galveston and Indianola, Texas, and .07 at Sydney, Nova Scotia. In all other districts the mean pressure is below that of April. The largest deficiencies occur in central California, and in the lower lake region. At Sacramento, California, a decrease of .11 has taken place; at other stations where deficiencies have occurred they are less marked.

DEPARTURES FROM THE NORMAL VALUES FOR THE MONTH.

The mean pressure of May is slightly above the normal over the southwestern part of the country, from the Mississippi river to the Pacific coast. It is also above the normal in Florida, the upper Missouri valley, northern slope, and middle plateau. In these districts the deficiences are uniformly slight, except in the upper Missouri valley, at Forts Buford and Stevenson, Dakota, where they are .12 and .09, respectively. In the north Pacific coast region, middle slope, lower Missouri valley, and in all districts east of the Mississippi river, except in Florida, the pressure is below the normal. The deficiences are greatest in the lake region and in the middle and south Atlantic states, where they are generally from .06 to .09.

BAROMETRIC RANGES.

The monthly barometric ranges have been greatest between the ninety-fifth and one-hundred and fifth meridians north of the thirty-seventh parallel of latitude, where they have exceeded 1.00, the largest, 1.19, being reported from Huron, Dakota.

The smallest monthly ranges occurred in southern California and in Arizona, 0.27 being reported from San Diego, California, and 0.31 from Fort Grant, Arizona, and Los Angeles, California.

In the several districts the monthly ranges have varied as follows:

New England.—From 0.74 on the summit of Mount Washington, New Hampshire, to 0.95 at Eastport, Maine.

Middle Atlantic states.—From 0.83 at Albany, New York, to 0.99 at Baltimore, Maryland, and Washington, District of Columbia.

South Atlantic states.—From 0.64 at Jacksonville, Florida, to 0.87 at Wilmington, North Carolina.

Florida peninsula.—From 0.41 at Key West, to 0.61 at Sanford.

Eastern Gulf.—From 0.48 at New Orleans, Louisiana, to 0.57 at Montgomery, Alabama.

Western Gulf.—From 0.41 at Galveston, Texas, to 0.68 at Fort Smith, Arkansas.

Ohio valley and Tennessee.—From 0.59 at Memphis, Tennessee, to 0.95 at Pittsburg, Pennsylvania.

Lower lakes.—From 0.69 at Rochester, New York, to 0.82 at Cleveland, Ohio.

Upper lakes.—From 0.64 at Port Huron, Michigan, to 0.94 at Duluth, Minnesota.

Extreme northwest.—From 0.94 ot Saint Vincent, Minnesota, to 1.11 at Moorhead, Minnesota.

Upper Mississippi valley.—From 0.67 at Cairo, Illinois, to 1.01 at Saint Paul, Minnesota.

Missouri valley.—From 0.92 at Leavenworth, Kansas, to 1.19 at Huron, Dakota.

Northern slope.—From 0.71 at Fort Assinniboine, Montana, to 1.07 at North Platte, Nebraska.

Middle slope.—From 0.78 on the summit of Pike's Peak, Colorado, to 1.02 at West Las Animas, Colorado.

Southern slope.—From 0.48 at Fort Concho, Texas, to 0.58 at Fort Stockton, Texas.

Southern plateau.—From 0.33 at Tucson, Arizona, to 0.64 at Santa Fé, New Mexico.

Middle plateau.—From 0.59 at Pioche, Nevada, to 0.72 at Salt Lake City, Utah.

Northern plateau.—From 0.85 at Spokane Falls, Washington Territory, to 0.94 at Lewiston, Idaho.

North Pacific.—From 0.70 at Roseburg, Oregon, to 0.75 at Portland, Oregon, and Olympia, Washington Territory.

Middle Pacific.—From 0.53 at Sacramento, California, to 0.67 at Cape Mendocino, California.

South Pacific.—From 0.27 at San Diego, California, to 0.54 at Visalia, California.

AREAS OF HIGH BAROMETER.

The high pressures for the month have not been of great extent or long duration, and have not been associated with any great climatic changes. In this connection attention may be invited to the fact before stated, that the pressure for the month is generally below the mean. Five areas of high barometer have been described. These have been accompanied by low areas, and the high pressures probably resulted from the vertical circulation of the air from the centres of depression in their immediate vicinity. The mean direction of the tracks of high pressures has been very nearly from the west to the east, which is the usual path for the month of May.

The minimum temperatures for the month do not appear to have been specially associated with these areas, with the exception of the north Atlantic coast, where the lowest temperatures were reported on the morning of the 1st in connection with high area i.

I.—The high area described as viii. in the April REVIEW was on the 1st central in the New England states and maritime provinces of Canada, where the pressure was from 0.3 to 0.5 inches above the mean. At the morning observation of the 2d, the isobar of 30.5 inches included all of Nova Scotia and a great portion of the Gulf of Saint Lawrence. During the day the high barometer moved slowly to the eastward beyond the limits of the chart. During its prevalence fair weather and light winds were reported from New England.

II.—On the 1st, the pressure was high in Manitoba, while a depression was developing in Colorado and Nebraska. Brisk to high northeasterly winds were reported from Minnesota and Dakota. On the 2d, the high area extended over the Lake Superior region, and high northeast winds were reported from upper lakes. On the 3d, the pressure was generally above the mean in Canada, but it ceased to exercise any marked influences.

III.—On the 4th, there was a slight increase of pressure in Missouri and Iowa, in rear of low area i. On the 5th, the high pressure, accompanied by fair weather and northwesterly winds, extended over the Ohio valley. On the 6th, the high area was transferred to the middle Atlantic coast in advance of low area iii., then moving over the northwest. On the 7th, the highest barometers were reported from the south Atlantic and east Gulf states, accompanied by southerly winds and high temperatures.

IV.—On the 9th, while low area iv. was moving over Nebraska and Iowa, there was a considerable rise of pressure in Manitoba. On the 10th, the high barometer extended to the southward, the rise at Omaha and Des Moines exceeding 0.7 inch. On the 11th, the high area covered the country from Manitoba to the Ohio valley. On the 12th, the highest pressures were reported from Minnesota and the upper lake region. On the 13th and 14th, the centre of high area was rapidly transferred to the eastward beyond the middle Atlantic coast in advance of low area v., moving over the Ohio valley and lake region.

V.—On the 14th, there was a considerable rise in the mercury in the upper Missouri valley and Minnesota in rear of low area v. On the 15th, accompanied by clearing weather and northwest winds, the high area became central in Missouri and Illinois. On the 16th, the high pressure extended from the lake region to the east Gulf and the south Atlantic coast. On the 17th, the highest barometers were reported from the middle states. On the 18th, the centre of high area was transferred to the maritime provinces of Canada, where the pressure was about 0.4 inch above the mean for the month. On the 19th, this area moved beyond the limits of the chart in advance of low area vi., then moving over the lake region.

AREAS OF LOW BAROMETER.

Nine areas of low barometer have been charted for the month of May. Chart i. exhibits the paths of the centres of these areas as determined from the tri-daily weather reports of this service.

The following table gives the latitudes and longitudes in which each depression was first and last observed, and the average hourly velocity of each depression:

Areas of low barometer.	First Observed.		Last Observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
	° ′	° ′	° ′	° ′	
No. I.	40 00	106 30	46 00	80 00	20.5
II.	31 00	81 00	34 30	75 00	17.0
III.	41 00	107 00	49 30	64 30	39.3
IV.	39 30	104 30	46 00	73 00	26.6
V.	40 30	102 00	40 00	74 30	27.2
VI.	39 30	106 30	50 00	64 00	24.5
VII.	34 30	92 00	47 00	59 00	17.3
VIII.	38 00	101 00	48 00	65 30	43.1
IX.	31 30	101 00	46 30	70 30	54.7
Mean hourly velocity					30.0

As no meteorological observations taken west of the Rocky mountains were telegraphed during the month to this office, no tracks of low area can be charted from the Pacific slope. Of these depressions it is worthy of remark, that six, numbers i., iii., iv., v., vi., and viii. were first noted in nearly the same region. The origin of number ii. is obscure; it may have developed where first charted or the track may be the northern path of a tropical hurricane after recurving to the eastward.

I.—On the 1st, a storm-centre developed in Colorado, which, on the 2d, slowly pursued an easterly track into Iowa and Missouri. Fair weather with warm southerly winds was reported from the south and east quadrants, and rain with cold northeasterly winds from the north and west quadrants. On the 3d, with a great diminution of storm energy, the depression became central in Indiana. On the 4th, the low area was central in the region of Lake Erie, and on the 15th, increasing slightly in energy, it moved to the northward beyond Lake Huron. Cautionary signals displayed at southern ports of Lake Michigan and on Lake Erie were justified by the following maximum velocities: Milwaukee, 37, ne.; Toledo, 27, e.

II.—The afternoon observation of the 1st showed that since the morning report a storm of considerable energy had developed at sea near the south Atlantic coast. At the midnight ob-

servation the fall of the barometer and the circulation of the winds showed that the centre was southeast of Charleston. On the 2d, the storm pursued with great energy its northeasterly course, passing beyond the North Carolina coast. At no time was the storm-centre within the limits of the land stations of this service. At this date marine reports are missing which might show where the storm originated. The following maximum velocities were reported from Savannah and Charleston, respectively, 36, n., and 41, ne. Cautionary signals were displayed from Smithville to Sandy Hook, and the following are the reported maximum velocities: Smithville, 35, ne.; Macon, 46, nw.; Hatteras, 56, ne.; Kittyhawk, 43, ne,; Cape Henry, 28, ne.; Chincoteague, 30, ne.; Delaware Breakwater, 33, ne.; Cape May, 26, ne.; Barnegat City, 25, e.

III.—At the midnight observation of the 5th a depression was developed in western Colorado, which, on the 6th, increasing considerably in energy, moved in a northeasterly track over the northwest. On the 7th, the storm-centre advanced rapidly over the lake region into the Saint Lawrence valley, passing on the 8th beyond the Gulf of Saint Lawrence. As is not unusual in May storms, very little rain fell to the south of the track of the centre of low area, the precipitation being generally confined to the north and west quadrants. Although not a severe storm, cautionary signals were displayed on Lakes Superior and Michigan, and the following maximum velocities were reported: Grand Haven, 25, s.; Duluth, 28, ne.

IV.—On the 8th, a storm exhibiting considerable energy, appeared in Colorado. On the 9th, the centre of depression moved to the eastward into Iowa accompanied by heavy rains and high winds. On the 10th, the storm had advanced over the lake region, and general rain fell as far south as the Gulf of Mexico. On the 11th, the storm-centre moved to the northeast, beyond the limits of the stations of observations. During the progress of this storm to the eastward, rain fell at nearly all the stations east of the Rocky mountains. Cautionary signals were displayed in advance of this storm on Lakes Michigan, Huron, and Erie, and were generally justified by the following maximum velocities: Escanaba, 33, ne.; Milwaukee, 31, se.; Grand Haven, 32. nw.; Mackinaw City, 52, e.; Alpena, 27, nw.; Port Huron, 29, nw.; Toledo, 32, sw.; Cleveland, 29, s.; Erie, 25, s.; Buffalo, 30, sw.

V.—On the 13th, a storm-centre, exhibiting considerable force, moved to the eastward over Colorado and Nebraska. On the 14th, increasing in energy, it advanced into Ohio. At the morning observations of this day the pressures in Iowa were from 0.5 to 0.6 inch below the normal. On the 15th, with a great diminution of energy, the centre of low area was transferred beyond the middle Atlantic coast. Cautionary signals were displayed for this storm on all the lakes, except Lake Ontario. The following are the maximum velocities: Duluth, 28, ne.; Milwaukee, 25, se.; Grand Haven, 29, ne.; Detroit, 28, ne.; Toledo, 40, n.; Cleveland, 28, n.

VI.—On the 17th, a very severe storm-centre, moving to the northeastward, appeared in Colorado. At the midnight observation the following low-pressures were reported: North Platte, and Yankton. 29.16; Omaha, 29.22; or all lower than 0.7 inch below the normal. On the 18th, the storm-centre, increasing in energy, moved into Minnesota, At the morning report the barometer at Yankton, 29.12, was 0.81 inches below the normal. On the 19th, the storm continued very severe as its centre moved over the upper lake region. On the 20th, the low area moved in an easterly track into the Saint Lawrence valley and disappeared the next day beyond the gulf of that name. This storm is especially notable for the high winds that appeared in the lake region after the passage of the centre of low area, and also for the development of a secondary depression (vii.) in Arkansas. For this storm, cautionary signals were displayed on all the lakes, except Lake Ontario, and were generally justified by the following maximum velocities: Duluth, 33, ne. and 28, nw.; Marquette, 33, s.; Chicago, 32, sw.; Milwaukee, 45, w.; Grand Haven, 37, s.; Detroit, 40, s.; Toledo, 32, sw.; Cleveland, 28, n.

VII.—As stated in the description of low area vi., vii. was a subsidiary developement from the former depression. At the midnight observation of the 19th, low area vi. was central north of Lake Huron, with the pressure rising in the upper lake region, the northwest, and thence to the Rio Grande valley. At the same time there was a decided fall of pressure in Arkansas. The morning observation of the 20th, showed a fall in pressure of 0.29 inch at Memphis. In the afternoon the lowest barometer, 29.52, was at Nashville; at the same time a great trough-like depression extended from the mouth of the Saint Lawrence river to Tennessee. At midnight the pressure in Virginia and North Carolina was, in general, 0.5 inch below the normal. On the 21st and 22d, the storm-centre, moving slowly to the northeastward, remained in the middle Atlantic states. High northerly winds with cold rains were reported from the lake region. On the 23d and 24th, diminishing in energy, the low area moved along and beyond the New England coast. Cautionary signals were displayed from Hatteras to Eastport, and the following maximum velocities registered: Hatteras, 36, sw.; Kittyhawk, 38, sw.; Delaware Breakwater, 33, se.; Cape May, 28, se.; Barnegat City, 33, s.; Sandy Hook, 38, e.; Block Island, 26, s.; Eastport, 40, ne.

VIII.—At the midnight observation of the 27th, a considerable depression was central in Kansas. On the 28th, it moved in an easterly path into Ohio, but without developing any special storm energy. On the 29th, the low area moved to the northeastward into the Gulf of Saint Lawrence. No cautionary signals were displayed for this low area.

IX.—On the 29th, the pressure was low in Texas, with light and variable winds. On the 30th, the low area, developing greatly in energy, moved very rapidly in a northeasterly track to the lower lake region. On the 31st, the storm-centre moved beyond the limits of the observing stations. Cautionary signals were displayed for this storm from Delaware Breakwater to Eastport, and were generally justified by the following velocities: Delaware Breakwater, 32, s.; Cape May 32, s.; Barnegat City, 29, sw.; Sandy Hook, 27, se.; New London, 25, s.; Block Island, 28, s.; Provincetown, 27, sw.; Thatcher's Island, 26, s.; Eastport, 28, se.

NORTH ATLANTIC STORMS DURING MAY, 1883.

[*Pressure expressed in inches and in millimetres; wind-force by scale of* 0—10.]

Chart ii. exhibits the tracks of the principal depressions that have moved over the north Atlantic ocean during May, 1883. The location of the various storm-centres has been approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing vessels in the north Atlantic, and from other miscellaneous data received at this office up to June 21st. The observations used are, in general, simultaneous, being taken each day at 7 h. 0 m. a. m., Washington, or 0 h. 8 m. p. m., Greenwich mean time.

Of the five depressions shown on the chart, only one, v., has been traced as a continuous storm from the North American continent northeastward to the British coasts. Two depressions apparently developed over the ocean near the fiftieth parallel, both moving in a northeasterly direction. The depressions i. and iv., after leaving the coast of the United States, filled up apparently west of the fiftieth meridian. Low area iii. was remarkable for the unusual depth, at this season of the atmospheric depression, and for the absence of the violent winds and stormy weather commonly associated with such depressions.

The weather over the north Atlantic during the month was generally fair, but dense fogs prevailed over the region west of the fortieth meridian almost uninterruptedly throughout the month. The atmospheric pressure was, in general, high.

The following are brief descriptions of the depressions traced on the chart.

I.—This was probably a continuation of the disturbance traced as low area ii. of chart i. During its passage northeastward along the coast of the Carolinas, it displayed great energy and several vessels sustained loss of spars and sails.

On the 4th, it was apparently central near N. 32° W. 69°; the bark "Commerce," in N. 31° 31′, W. 66° 31′ reported barometer 29.71 (754.6), wind sse., force 4, threatening; while vessels to the west of 70° west longitude, had fresh to strong northerly gales. During the 5th, the disturbance remained near N. 35°, W. 67°, but on the 6th it apparently began to move northeastward, and on the 7th it was central near N. 41°, W. 61°, causing rain in the Canadian maritime provinces. The subsequent course of this depression cannot be indicated, owing to the absence of reports from the region indicated on the chart by the limits of icebergs, but it is probable that the depression filled up near the Banks, as on the following day the barometer was generally high to the westward.

II.—On the 7th, the reports indicated the presence of a disturbance over the northwestern part of the Bay of Biscay, with its centre probably west of Brest. The lowest reported barometer was observed on board the s. s. "Rotterdam," in N. 49° 46′, W. 8° 48′, on the 7th, when it read 29.47 (748.5), wind nne., force 6. During the day the depression passed northeastward to the English Channel.

III.—On the morning of the 10th, a depression was observed near N. 50°, W. 30°, its presence being indicated by the following vessel-reports: s. s. "Rhynland," in N. 46° 58′, W. 31° 04′, barometer 29.79 (756.7), a fall of more than half an inch, wind w., force 4, foggy; s. s. "Pavonia," in N. 48° 31′, W. 24° 28′, barometer 29.8 (756.9), wind sse., force 3, foggy; bark "Rebus," in N. 46° 29′, W. 26° 5′, barometer 29.81 (757.2), wind ssw., force 5, light rain. By the 11th, the area of distribution had greatly increased and the barometer had fallen to 29.29 (744.0); fair weather prevailed near the centre, with cloudy weather or rain to the eastward, while the winds blew with the force of a moderate gale. During the day, the barometer continued to fall and, by the morning of the 12th, the region of least pressure was between N. 47° and 52°, and W. 20° and 25°; the s. s. "City of Paris," in N. 47° 24′, W. 24° 09′, reported: at the simultaneous observation, the barometer read 29,03 (737.3), wind sw., force 7, squally; at 7.45 p. m. of the same day, the wind hauled to wnw., with a heavy squall and rain, and blew a strong gale for three hours, the lowest barometric reading was 28.99 (736.3). Captain Kennedy, of the s. s. "Germanic," (about N. 51° 14′, W, 14° 37′,) reported: 12th, noon, wind sse, moderate gale and confused sea, weather fine, barometer 29.08 (738.6); 7.30 p. m., wind ssw., fresh gale and squally, barometer 29.01 (736.8). 13th, (about N. 50° 50′, W. 19° 50′,) 1 a. m. wind chopped into wnw., moderating to strong breeze, with confused sea, barometer 28.84 (732.5); between 1.30 and 2.00 a. m., wind veering between ssw. and wnw., moderate to light breeze and cloudy; barometer 28.82 (732.0). At 2.30 a. m. the barometer began to rise gradually and the wind settled into a strong nw. breeze and squally, afterward increasing to fresh nnw. and nw. gale, which lasted until 6 p. m., when it moderated to strong nw. breeze, barometer, 29.76 (755.9). The s. s. "Marengo," in N. 48° 58′, W. 25° 06′, reported barometer 29.06 (738.1), wind sw. by w., force 6, squally and rainy, and no vessel within the region bounded by N. 47° and 52° and W. 20° and 30°, reported pressures exceeding 29.2 (741.7). On the 13th, the disturbance was central at some distance off the northwest coast of Ireland, causing strong southerly gales and rain over that country; to the west of the twentieth meridian, strong n. and nw. winds continued. On the 14th, the depression was passing northeastward and was near the Hebrides.

IV.—This disturbance was probably a continuation of that charted as low area v. chart i. It passed off the New Jersey coast into the Atlantic on the 15th, and moving northeastward, was central near N. 41° W. 67°, on the 16th. On that date, the barkentine "C. S. Bushnell," in N. 38° 50′, W. 67° 20′, reported barometer 29.57, wind s., force 7, cloudy; wind shifting at 10 a. m. to nnw., strong gale with rain; the s. s. "Elysia," in N. 41° 14′, W. 63° 48′, reported a. m. of 15th, wind hauling to s.; p. m., fresh s. breeze; midnight, heavy sw. swell; 7 a. m. of 16th, wind falling light, barometer 29.64 (752.8). On the 17th, the pressure increased and the depression probably filled up in front of an area of high pressures which stretched westward to the fiftieth meridian. From the 18th to the 24th, the pressure was high over the ocean, except in the vicinity of the Bahamas and Bermudas, where a disturbance was probably present. Captain Shackford, of the s. s. "Acapulco," in W. 74° and between N. 17° and 22°, reported heavy northerly swell. "Such a swell rolling into Crooked Island passage is very unusual." Captain Tracy of the brig "Teneriffe," near the same position, also reported: "20th, during the last two days, the weather has been fine, but the wind at times has been very strong and baffling, with a very heavy rolling sea from the northward. Never saw anything like it before in Crooked Island passage at this season of the year."

V.—This disturbance was probably a continuation of low area vii. of chart i. The centre of depression passed to the northeast of the Maritime Provinces on the 25th, and continuing its northeasterly course, was central near N. 50°, W. 50°, on the 26th. The s. s. "Colina," N. 48° 39′, W. 48° 22′, reported winds shiting from s. by e. to wsw., barometer 29.4 (746.7); during the day the disturbance moved northeastward, north of the region covered by the reports, and on the 27th the region of least pressure was shown near N. 55°, W. 30°; the s. s. "Dominion," reporting barometer 29.4 (746.7), wind sw. by s., force 3, hazy. On the 28th, the disturbance moved northeastward north of the fifty-fifth parallel, and on the 29th, its presence was indicated to the westward of the Hebrides by strong southerly gales in those islands and southwesterly gales in Ireland.

OCEAN ICE.

Chart ii. also exhibits the southern and eastern limits of icebergs in the north Atlantic during the month of May, 1883. This chart is based on reports communicated by shipmasters to this office; reports furnished through the co-operation of the "New York Herald Weather Service," and other data published by the "New York Maritime Register."

In May, 1883, the eastern limit of icebergs in the north Atlantic ocean reached W. 45°; south of the forty-fourth parallel the limit gradually receded until it reached W. 47°. The southern limit extended from Cape Breton Island southeastward to N. 40° 30′. No ice-fields were reported in the Atlantic ice region during the month, but much ice was observed in the Gulf of Saint Lawrence. Icebergs were most numerous from N. 42° to 44° and between W. 52° and 47°.

Compared with the chart for last month (April), there has been a very slight southerly movement, but no change has occurred in the position of the eastern limit south of the forty-fifth parallel. To the northward of that parallel the eastern limit has receded about two degrees.

A comparison with the ice-chart for May, 1882, shows: 1st, that the eastern limit of the ice region in May, 1883, was about three degrees to the westward of that for May, 1882, but the southern limit remained the same in both years; 2d, that the number and size of the icebergs reported during May, 1882, greatly exceeded those observed in the same month of this year, while field ice was entirely absent in the region covered by the reports.

In May, 1882, the Gulf of Saint Lawrence was blocked by heavy ice, and many vessels were hemmed in. Large masses of ice drifted along the shores of Nova Scotia southward to Halifax, in which port vessels were ice-bound at the close of the month. In May of this year none of the above conditions have been reported.

Icebergs were reported as follows:

2d.—S. S. "Rugia," in N. 41° 30′, W. 50° 06′, passed an iceberg.

3d.—S. S. "Alaska," in N. 43° 00′, W. 49° 40′ to W. 51°, passed several large icebergs; bark "Lynwood," in N. 42° 58′, W. 48° 10′, saw a large iceberg, apparently about one and a half miles long and about two hundred and fifty feet high; s. s.

"Sardinian," in N. 45° 39′, W. 47° 10′, passed several small pieces of ice; also in p. m. passed several icebergs; saw last iceberg in N. 45° 03′, W. 50° 17′.

4th.—S. S. "Main," in N. 42° 31′, W. 49° 45′, passed a large iceberg; also in N. 42° 15′, W. 51° 03′, passed some smaller ones; s. s. "Lord Gough," in N. 40° 56′, W. 47° 20′, passed a large iceberg.

5th.—Ship "Zambesi," sixteen miles east of Scatari, Cape Breton, struck heavy ice, stove bow, and sank in twenty minutes; ship "J. W. Wendt" passed close to an iceberg fifteen feet high and sixty feet long.

6th.—S. S. "State of Pennsylvania," in N. 41° 28′, W. 51° 50′, passed two icebergs; s. s. "Pavonia," in N. 41° 01′, W. 47° 27′, passed a large iceberg.

7th.—S. S. "Thornholme," in N. 43°, W. 50°, passed three icebergs; s. s. "Leerdam," in N. 45° 40′, W. 45° 12′, passed several large cakes of ice.

8th to 11th.—Ship "Festina Lente," near Bird Rock and Magdalen Islands, encountered much ice.

11th.—S. S. "Wyoming," in N. 42° 51′, W. 47° 33′, passed a large iceberg; also from N. 42° 25′, W. 51° 00′ to N. 42° 40′, W. 49° 53′, passed several icebergs.

13th.—S. S. "State of Florida," in N. 42° 23′, W. 49° 27′, passed an iceberg.

14th.—S. S. "Rotterdam," in N. 44° 15′, W. 46° 30′, passed two icebergs; also many small pieces of ice; s. s. "Landaff City," in N. 43° 45′, W. 48° 30′, passed an iceberg.

16th.—S. S. "California," in N. 42° 48′, W. 46° 53′, passed an iceberg; s. s. "Fulda," in N. 42° 37′, W. 48° 34′, passed a large iceberg.

17th.—S. S. "California," in N. 41° 55′, W. 52° 08′, passed an iceberg.

18th.—S. S. "Assyrian Monarch," in N. 45° 40′, W. 46° 00′, passed a large iceberg.

19th.—S. S. "Bothnia," in N. 42° 49′, W. 51° 46′, passed an iceberg; s. s. "Assyrian Monarch," in N. 45° 00′, W. 46° 49′, passed several icebergs.

20th.—S. S. "Jan Breydel," in N. 44° 19′, W. 48° 15′, passed two large icebergs.

21st.—S. S. "Adriatic," in N. 42° 35′, W. 48° 50′, passed an iceberg; also in N. 42° 06′, W. 52° 00′, passed another; s. s. "Cornwall," in N. 46° 00′, W. 45° 35′, passed a small iceberg about thirty feet high.

22d.—S. S. "Lord Gough," in N. 43° 00′, W. 46° 00′, passed two large icebergs.

25th.—S. S. "Pavonia," in N. 43° 42′, W. 47° 15′, passed an iceberg.

26th.—S. S. "De Ruyter," in N. 45° 25′, W. 48° 02′, passed two icebergs about two hundred feet high; s. s. "Pavonia," in N. 42° 32′, W. 52° 10′, passed an iceberg; also in N. 42° 44′, W. 50° 29′, passed three others; s. s. "Colina," in N. 48° 39′, W. 48° 22′, sighted four icebergs.

27th.—S. S. "Labrador," in N. 43° 10′, W. 51° 40′, passed two icebergs.

28th.—S. S. "Labrador," in N. 42° 55′, W. 52° 44′, passed two icebergs; s. s. "State of Nebraska," from N. 43° 01′, W. 49° 22′ to N. 42° 44′, W. 52° 04′, passed seven icebergs.

31st.—S. S. "Furnessia," in N. 43° 32′, W. 46° 03′, passed an iceberg; s. s. "Bohemia," in N. 43° 40′, W. 48° 00′, passed an iceberg.

No date.—Bark "Karl," in N. 40° 30′, W. 47° 00′, saw an iceberg twenty-five feet high and three hundred feet long; bark "Vasco da Gama," in N. 47° 40′, W. 50° 16′, passed about a dozen icebergs; ship "Christine," in N. 44° 00′, W. 49° 00′, saw an iceberg about four hundred feet high.

TEMPERATURE OF THE AIR.

[*Expressed in degrees, Fahrenheit.*]

The distribution of mean temperature over the United States and Canada, for the month of May, 1883, is exhibited on chart iii., by the dotted isothermal lines.

The general distribution of mean temperature during the month of May, and the districts of maximum departures from the May normal of each year, since 1873, are as follows:

Districts.	Maximum departures.	Year.	Remarks.
	°		
		1873	Above the normal over northern Michigan, Lake Huron, southern Ohio, Kentucky, Tennessee, and eastern Massachusetts; below the normal in Kansas, Missouri, Minnesota, Wisconsin, Indiana, Illinois, the lower lake region, and throughout the Atlantic and Gulf states.
Missouri valley	+ 4.6	1874	Below the normal on the Atlantic coast; above the normal north of the Ohio and Missouri rivers; normal in the Gulf states and on the Pacific coast.
Upper Mississippi valley	+ 3.6		
Minnesota	+ 3.4		
South Atlantic states	− 2.6		
Saint Lawrence valley	− 4.8	1875	Below the normal in the Saint Lawrence valley, along the Atlantic coast, in the upper lake region, Mississippi valley, and on the Pacific coast; above the normal in the lower lake region, Gulf states, and Missouri valley.
Pacific coast	− 1.2		
Lower lakes	+ 2.7		
Gulf states	+ 1.2		
Saint Lawrence valley	− 3.8	1876	Normal in the middle Atlantic and Gulf states and upper Mississippi valley; above the normal in the Ohio and Missouri valleys, Minnesota, and lake region; below the normal in the Saint Lawrence valley, New England, south Atlantic states, and on the Pacific coast.
Pacific coast	− 2.1		
Lower lakes	+ 2.5		
Missouri valley	+ 2.0		
South Atlantic states	− 3.7	1877	Normal in the lower lakes, upper Missouri, upper Mississippi, and Saint Lawrence valleys; above the normal in Minnesota, the upper lakes, and New England; below the normal along the Gulf, middle, and south Atlantic coasts, and also on the Pacific coast.
Ohio valley	− 2.4		
Minnesota	+ 2.2		
Upper lakes	+ 2.2		
Missouri valley	− 4.6	1878	Normal in the lake region; below the normal in the Missouri, upper Mississippi, Ohio, and Saint Lawrence valleys; above the normal on the Atlantic, Gulf and Pacific coasts.
Upper Mississippi valley	− 4.4		
Minnesota	− 3.3		
New England	+ 1.7		
South Atlantic states	+ 1.7		
Eastern slope	+ 4.3		
Northern slope	+ 3.0		
Boise City, Idaho	− 6.2	1879	Above the normal in all districts east of the Rocky mountains, except 1°.5 below the normal in Florida; below the normal on the Pacific coast, in Arizona, Nevada, and Idaho.
Umatilla, Oregon	− 4.2		
Tucson, Arizona	− 3.6		
Middle Atlantic states	+ 7.4	1880	Above the normal in the middle slope, west Gulf states, and in the districts east of the Missouri and lower Mississippi rivers, except Florida; below the normal in the northern and southern slopes, and west of the Rocky mountains, except on the middle Pacific coast.
Upper lakes	+ 6.6		
Upper Mississippi valley	+ 5.3		
Ohio valley	+ 5.1		
Northern plateau	− 5.9		
North Pacific	− 3.8		
Upper Mississippi valley	+ 6.2	1881	Above the normal over the entire country, except normal in Florida, and slightly below normal in the Rio Grande valley and southern slope.
Minnesota	+ 4.8		
Upper lakes	+ 4.0		
Salt Lake City, Utah	+ 4.1		
Rio Grande valley	− 2.2		
Southern slope	− 0.5		
Upper Mississippi valley	− 8.2	1882	Normal in the middle and north Pacific coast regions; slightly above the normal in Florida; decidedly below the normal in all other districts.
Missouri valley	− 7.2		
Ohio valley	− 6.6		
Saint Lawrence valley	− 6.4		
Florida	+ 0.5		

The following are some of the extreme monthly mean temperatures reported from Signal-Service stations:

Stations reporting highest.	°	Stations reporting lowest.	°
Eagle Pass, Texas	81.7	Pike's Peak, Colorado	19.5
Uvalde, Texas	79.7	Mount Washington, New Hampshire	34.0
Key West, Florida	79.5	Deadwood, Dakota	43.3
Fort Stockton, Texas	76.6	Marquette, Michigan	44.0
Indianola, Texas	76.2	Alpena, Michigan	44.6
Galveston, Texas	75.6	Mackinaw City, Michigan	44.7
Punta Rassa, Florida	75.3	Escanaba, Michigan	45.1
Brackettville, Texas	75.1	Duluth, Minnesota	45.5
Cedar Keys, Florida	75.1	Saint Vincent, Minnesota	45.8
Yuma, Arizona	74.4	Cheyenne, Wyoming	46.3
New Orleans, Louisiana	74.3	Eastport, Maine	47.4
Sanford, Florida	74.0	Fort Washakie, Wyoming	47.8

The mean temperature of May, 1883, compared with the normal, as determined from the Signal-Service records, shows the month to have been colder than the average May, in nearly all districts. In the Rio Grande valley, and north Pacific coast region the mean temperature is 1°.1 above the normal; in the middle Atlantic states, the departure above the normal is but 0°.1; and a normal condition is reported from the northern plateau. With the exception of the above districts, the mean temperature is below the normal in all other parts of the country. In New England, the deficiency is very slight, being only 0°.3, but marked departures occur in the northern districts from the lake region westward to the Rocky Mountains. The

extreme northwest, upper Mississippi and Missouri valleys are the districts of greatest deficiency. Over this area the departure from the normal temperature has averaged 6°.5, while in California, the south Atlantic states, and Florida, the departures below the normal vary from 1°. to 1°.7.

In the first column of the following table is shown the mean temperature of May in previous years for the several districts, as determined from observations made at the Signal-Service stations; the second column shows the mean temperature of May, 1883, and the third column shows the departure of May, 1883, from the normal.

Average Temperatures for May, 1883.

Districts.	Average for May. Signal Service observations.		Comparison of May, 1883, with the average for several years.
	For several years.	For 1883.	
	°	°	°
New England	55.1	54.8	0.3 below.
Middle Atlantic states	61.4	61.5	0.1 above.
South Atlantic states	70.0	68.9	1.1 below.
Florida peninsula	77.0	76.0	1.0 below.
Eastern Gulf	73.3	70.6	2.7 below.
Western Gulf	74.4	72.3	2.1 below.
Rio Grande valley	77.7	78.8	1.1 above.
Tennessee	69.6	66.2	3.4 below.
Ohio valley	65.9	62.1	3.8 below.
Lower lakes	56.2	51.6	4.6 below.
Upper lakes	52.6	47.5	5.1 below.
Extreme northwest	54.1	47.6	6.5 below.
Upper Mississippi valley	63.9	57.8	6.1 below.
Missouri valley	62.4	55.5	6.9 below.
Northern slope	53.9	49.2	4.8 below.
Middle slope	60.6	58.5	2.1 below.
Southern slope	73.4	73.0	0.4 below.
Northern plateau	54.9	55.0	0.1 above.
Middle plateau	57.0	55.0	2.0 below.
Southern plateau	68.6	65.2	3.4 below.
North Pacific	54.9	55.8	0.9 above.
Middle Pacific	62.6	61.2	1.4 below.
South Pacific	67.2	65.5	1.7 below.
Mount Washington, N. H	33.5	34.0	0.5 above.
Pike's Peak, Colo	22.5	19.5	3.0 below.

DEVIATIONS FROM MEAN TEMPERATURE.

The departures exhibited by the reports from the regular Signal-Service stations are shown in the table of average temperatures for May, 1883. Voluntary observers report the following notes in connection with this subject:

California.—Mr. S. H. Gerrish, of Sacramento, reports the mean temperature at that place to have been the lowest recorded during May, since 1860.

Illinois.—Mattoon, Coles county: mean temperature, 61°, is 4°.2 below the May average of the last four years. Anna, Union county: mean temperature, 64.7, is 2°.7 below the May average of the last eight years. Riley, McHenry county: mean temperature, 52°.4, is 4°.6 below the May average of the last twenty-two years. Swanwick, Perry county: mean temperature, 60°.3, is 6°.7 below the May average.

Indiana.—Vevay, Switzerland county: mean temperature, 64°.6, is about the May normal for the past eight years. The mean temperature of the spring season ending May 31, 1883, is 54°.32, or 11°.12 below the average of the corresponding periods for the last eight years.

Wabash, Wabash county: mean temperature, 58°.5 is 3°.1 below the May average of the last seven years.

Logansport, Cass county: mean temperature, 61°.8 is 2°.9 below the May mean of the last twenty-four years. The monthly extremes are: maximum, 89°; minimum, 40°. The May extremes for the last twenty-four years are: maximum, 99° in 1870 and 1881; Minnimum, 28° in 1876 and 1877.

Iowa.—Muscatine, Muscatine county: mean temperature, 56°.2, is 4°.8 below the May average of the last forty-four years.

Kansas.—Lawrence, Douglas county: mean temperature, 62°.0 is 4°.1 below the mean of the last fifteen years. The extremes for the month are: maximum, 91°; minimum, 39°. The extremes for the past fifteen years are: maximum, 95° in 1874, '75 and '80; minimum, 30° in 1875. Yates Centre, Woodson county: mean temperature, 61.8, is 2°.8 below the mean of the past three years. Independence, Montgomery county: mean temperature, 62°.9, is 3°.6 below the May average of the last twelve years. The monthly mean of that period, 72°, occurred in 1880, the lowest, 60°.8, occurred in 1872.

Wellington, Sumner county: mean temperature, 61°.0, or 4°.8 below the May average of the last four years.

Maine.—Gardiner, Kennebec county: mean temperature, 52°.1, is 1°.4 below the May average of the last forty-seven years.

Maryland.—Fallston, Harford county: mean temperature, 60°.9, is 0°.6 below the May average of the last twelve years. The highest May mean of that period, 67°.5, occurred in 1880; the lowest 55°.6, occurred in 1876.

Michigan.—Thornville, Lapeer county: mean temperature, 54°, is 5° below the May normal for a long period.

Missouri.—See report of Professor Nipher, Director of the "Missouri Weather Service," under "notes and extracts."

New York.—Palermo, Oswego county: mean temperature, 51°.8, is 3° below the May mean of the last thirty years. The highest May mean of that period, 60°.7, occurred in 1880; the lowest, 47°.5, occurred in 1867.

North Volney, Oswego county: mean temperature, 52°.2, is 2°.9 below the May mean of the last sixteen years.

Nevada.—Carson City, 2d, 3d, 7th, 9th, 14th, 15th, 16th, 18th; Pioche, 2d, 3d.

Ohio.—Wauseon, Fulton county: mean temperature, 52°.7, is 6°.6 below the May mean of the last thirteen years. During that period the highest May mean, 64°.3, occurred in 1880; the lowest, 52°.2, occurred in 1882.

Texas.—New Ulm, Austin county: mean temperature, 73°.6, is 1°.2 below the May average of the last eleven years. During that period the highest May mean, 77°.4, occurred in 1879; the lowest, 73°.2, occurred in 1877.

Vermont.—Woodstock, Windsor county: mean temperature, 54°.3, is 0°.3 above the May average of the last sixteen years. The highest May mean of that period, 61°.2, occurred in 1880; the lowest, 50°.1, occurred in 1873.

Virginia.—Variety Mills, Nelson county: mean temperature, 64°.4, is 0°.8 below the May mean of the last six years.

Wytheville, Wythe county: mean temperature, 61°.2, is 0°.4 below the mean of a period of twenty years.

West Virginia.—Helvetia, Randolph county: mean temperature, 58°.5, is 0°.2 above the May average of the last seven years.

MONTHLY RANGES OF TEMPERATURE.

The monthly ranges of temperature for May, were smallest in southern Florida, and along the coasts of Rhode Island, North Carolina, and Texas, where they have varied from 20° at Key West, Florida, to 29° at Indianola, Texas, and Point Judith, Rhode Island. They have been greatest in Arizona, the largest monthly range, 82°, being reported from San Carlos. The following are the smallest monthly ranges reported: Key West, Florida, 20°; Galveston, Texas, 24°; Block Island, Rhode Island, 27°; Hatteras and Portsmouth, North Carolina, 28°; Indianola, Texas, and Point Judith, Rhode Island, 29°; Macon, North Carolina, and Punta Rassa, Florida, 30°; New Orleans, Louisiana, and Cape May, New Jersey, 31°; Pike's Peak, Colorado, 33°; New London, Connecticut, and Smithville, North Carolina, 34°; Barnegat City, New Jersey, 35°. The largest are: San Carlos, Arizona, 82°; Phœnix, Arizona, 66°; Smithville, and Tobacco Garden, Dakota, and Terry's Landing, Montana, 65°; Billings and Deer Lodge, Montana, Wickenburg, Arizona, and Visalia, California, 63°; Fort Custer, Montana, and Fort Buford, Dakota, 62°; Fort Apache and Tucson, Arizona, and Yankton, Dakota, 61; Los Angeles, California, Yuma and Prescott, Arizona, 60°.

The greatest daily ranges of temperature have varied in the different districts as follows:

New England.—From 20° at Block Island, Rhode Island, on the 18th, to 32° at Boston, Massachusetts, on the 7th.

Middle Atlantic states.—From 21° at Barnegat City, New Jersey, on the 24th, to 37° at Lynchburg, Virginia, on the 4th.

South Atlantic states.—From 18° at Hatteras, North Carolina, on the 10th, to 35° at Augusta, Georgia, on the 25th.

Florida Peninsula.—From 15° at Key West, on the 1st, to 30° at Sanford, on the 20th.

Eastern Gulf.—From 19° at New Orleans, Louisiana, on the 20th, to 33° at Mobile, Alabama, on the 23d.

Western Gulf.—From 15° at Galveston, Texas, on the 5th, to 39° at Fort Smith, Arkansas, on the 7th.

Ohio valley and Tennessee.—From 29° at Cincinnati, Ohio, on the 7th, to 38° at Knoxville, Tennessee, on the 24th.

Lower lakes.—From 32° at Detroit, Michigan, on the 1st, to 42° at Rochester, New York, on the 10th.

Upper lakes.—From 24° at Milwaukee, Wisconsin, on the 18th and 20th, to 32° at Mackinaw City, Michigan, on the 19th, and at Alpena, Michigan, on the 20th and 23d.

Extreme northwest.—From 34° at Bismarck, Dakota, on the 9th, to 42° at Fort Buford, Dakota, on the 21st.

Table of Comparative Maximum Temperatures for the Month of May.

State or Territory.	Maximum for May, 1883, Signal Service.		Highest since Signal-Service stations were opened—3 to 12 years.			Highest from any other source.			
	Station.	Temp.	Station.	Temp.	Year.	Place.	Temp.	Year.	Length of Record.
		°		°			°		
Alabama	Montgomery	91	Mobile	98	1878	Mount Vernon Arsenal	102		34 years.
Do	Mobile	96	Montgomery	98	1875				
Arizona	Yuma	109	Maricopa Wells	105	1876	Fort Verde	111		12 "
Do	Phœnix	107	Tucson	106	1881	Fort Mojave	110		11 "
Arkansas	Fort Smith	93	Little Rock	91	1880	Washington, near	94		28 "
Do	Little Rock	87				Fort Smith	93		21 "
California	Visalia	101	Los Angeles	97	'79,'80	Fort Miller	113		14 "
Do	Los Angeles	100	Visalia	97	'78,'79				
Colorado	Denver	79	Denver	92	1874	Fort Lyon	99	1880	23 "
Connecticut	New Haven	78	New Haven	89	1880	New Haven	93		86 "
Do	New London	73	New London	89	1881				
Dakota	Yankton	89	Fort Sully	101	1874	Fort Abercrombie	102		19 "
Do	Tobacco Garden	83	Pembina	96	1874	Fort Randall	101		23 "
Delaware	Delaware Breakwater	80	Delaware Breakwater	89	1880	Fort Delaware	91		45 "
Do						Dover	94	1880	7 "
District of Columbia	Washington	90	Washington	96	1880	Washington	96		59 "
Florida	Sanford	93	Jacksonville	98	1874	Houston	100	'79,'80	4 "
Do	Pensacola	90				Okahumpka	99	1879	4 "
Georgia	Savannah	94	Augusta	100	1878	Oglethorpe Barracks	97	1878	40 "
Do	Atlanta	84	Tybee Island	99	1878				
Idaho	Eagle Rock	80	Boisé City	88	1881	Fort Lapwai	101		18 "
Do			Lewiston	86	1879				
Illinois	Springfield	87	Cairo	92	1874	Chicago	98		38 "
Do	Chicago	80				Mattoon	98	1876	2 "
Indiana	Indianapolis	83	Indianapolis	89	'74,'81	Logansport	99	1881	2 "
Do						Vevay	96		13 "
Indian Territory	Fort Supply	92	Fort Sill	97	1880	Fort Arbuckle	100		30 "
Do			Fort Gibson	94	'74,'80	Fort Gibson	99		47 "
Iowa	Dubuque	84	Dubuque	94	1874	Boonsborough	96	1880	4 "
Do	Keokuk	84	Des Moines	93	1880	Nora Springs	96	1876	6 "
Do						Glenwood	96	1880	1 "
Kansas	Leavenworth	89	Dodge City	98	'79,'80	Fort Larned	99		18 "
Do			Leavenworth	94	'74,'75	Fort Riley	99		23 "
Kentucky	Louisville	87	Louisville	93	1881	Newport Barracks	90		29 "
Do						Bowling Green	90	1880	3 "
Louisiana	Shreveport	95	Shreveport	101	1875	Baton Rouge	99		36 "
Maine	Portland	73	Portland	94	1880	Brunswick	98		53 "
Maryland	Baltimore	86	Baltimore	95	1881	Fort Washington	97		38 "
Do	Ocean City	79				New Market	98	1877	3 "
Massachusetts	Boston	88	Boston	97	1880	Somerset	97	1880	7 "
Do	Provincetown	74				Williamstown	95		60 "
Michigan	Mackinaw City	80	Marquette	95	1874	Detroit	94		38 "
Do	Escanaba	70				Ontonagon	94		11 "
Minnesota	Saint Paul	75	Saint Paul	94	1874	Fort Ripley	101		16 "
Mississippi	Vicksburg	91	Vicksburg	95	'74,'77	Brookhaven	98	1875	5 "
Missouri	Saint Louis	90	Saint Louis	93	1874	Corning	100	1875	7 "
Do						Saint Louis	97	1878	40 "
Montana	Deer Lodge	87	Fort Keogh	98	1881	Fort Shaw	98		13 "
Nebraska	North Platte	87	North Platte	94	1880	Fort McPherson	100	1879	
Do	Omaha	87							
Nevada	Pioche	84	Winnemucca	86	1881	Camp Halleck	104		11 "
New Hampshire	Mount Washington	61	Mount Washington	62	'79,'81	Auburn	96	1881	5 "
Do						Grafton	96	1880	2 "
New Jersey	Sandy Hook	84	Sandy Hook	93	1880	New Lisbon	101	1880	1 "
Do	Little Egg Harbor	78				New Brunswick	98	1880	5 "
New Mexico	Fort Bayard	85	La Mesilla	101	'79,'81	Fort McRae	109		11 "
Do	Santa Fé	78				Fort Craig	108		25 "
New York	Rochester	84	New York City	94	1880	West Point	101	1880	55 "
Do	Oswego	84	Oswego	94	1879	Newberg	98		40 "
North Carolina	Kittyhawk	86	Wilmington	95	1878	Weldon	100	1880	7 "
Do	Charlotte	86	Kittyhawk	93	1880	Fort Johnson	92		57 "
Ohio	Cincinnati	85	Cincinnati	94	'74,'75	Cincinnati	96	'77,'81	
Do	Columbus	85				Marietta	94		53 "
Oregon	Portland	84	Umatilla	92	1878	Fort Dalles	96		15 "
Do	Roseburg	84							
Pennsylvania	Pittsburg	90	Philadelphia	96	1880	Philadelphia	98	1880	120 "
Do	Erie	84	Pittsburg	95	1881	Milton	100	1881	2 "
Rhode Island	Narragansett Pier	75	Newport	85	1881	Providence	91		35 "
Do						Fort Adams	91	1880	40 "
South Carolina	Charleston	91	Charleston	94	1878	Charleston	94		105 "
Do						Aiken	97	1881	6 "
Tennessee	Memphis	87	Memphis	96	1879	Humboldt	98		4 "
Do	Chattanooga	87				Ashwood	96	1879	3 "
Texas	Eagle Pass	109	Eagle Pass	116	1879	Ringgold Barracks	123	1879	32 "
Do	Uvalde	105	Uvalde	113	1879	Camp Stockton	111		15 "
Utah	Salt Lake City	83	Salt Lake City	91	1874	Camp Douglas	91		16 "
Do						Mount Carmel	96.4	1876	3 "
Vermont			Burlington	91	1880	Charlotte	96	1878	7 "
Do						Lunenburg	88		16 "
Virginia	Cape Henry	91	Norfolk	98	1880	Alexandria	96		12 "
Do	Lynchburg	90	Lynchburg	96	1881	Accotink	97	'80,'81	6 "
Washington	Dayton	82	Dayton	90	1880	Fort Walla Walla	99		14 "
West Virginia			Morgantown	91	1875	Weston	100	1877	2 "
Do						Helvetia	90	1877	5 "
Wisconsin	La Crosse	78	La Crosse	96	1874	Embarras	98		14 "
Wyoming	Cheyenne	82	Cheyenne	88	1874	Fort Laramie	98		27 "

Table of Maximum and Minimum Temperatures for May, 1883.

State or Territory.	Signal Service.			U. S. Army Post Surgeons, or Voluntary Observers.		
	Station.	Max.	Min.	Station.	Max.	Min.
		°	°		°	°
Alabama	Mobile	96	47	Demopolis	94	39
Do	Montgomery	91	44	Birmingham	90	31
Arizona	Yuma	109	49	Maricopa	105	60
Do	Fort Apache	90	29	Fort Bowie	92	44
Arkansas	Fort Smith	93	45	Brinkley	89	33
Do	Little Rock	87	44	Mount Ida	86	32
California	Visalia	101	38	Indio	111	33
Do	Los Angeles	100	40	Kingsburg	108	38
Do				Cisco	78	21
Colorado	Denver	79	32	Fort Lyon	92	32
Do	Pike's Peak	36	3	Fort Garland	75	19
Connecticut	New Haven	78	34			
Dakota	Yankton	89	28	Fort Sully	86	31
Do	Tobacco Garden	83	18	Fort Meade	84	20
Delaware	Del. Breakwater	80	43			
District of Columbia	U. S. Signal Office	90	43	Rock Creek Bridge	92	50
Florida	Sanford	93	51	Live Oak	95	40
Do	Pensacola	90	47	Waldo	97	46
Georgia	Savannah	94	51	Way Cross	97	42
Do	Atlanta	84	40	Madison	91	31
Idaho	Eagle Rock	80	36			
Illinois	Springfield	87	34	Bunker Hill	90	28
Do	Chicago	80	36			
Indiana	Indianapolis	83	35	Mitchell	90	44
Do				Glenwood	80	30
Indian Territory	Fort Supply	92	40	Fort Reno	89	40
Iowa	Dubuque	84	32	Logan	90	34
Do	Keokuk	84	38	Muscatine	84	31
Kansas	Leavenworth	89	39	Clay Centre	90	42
Do				Yates Centre	88	35
Kentucky	Louisville	87	37	Bowling Green	87	38
Louisiana	Shreveport	95	49	Franklin	100	48
Do	New Orleans	88	56	Coushatta	96	44
Maine	Portland	73	37	Cornish	84	36
Do	Eastport	69	33			
Maryland	Baltimore	86	45	Great Falls	88	45
Do	Ocean City	79	40	Sandy Springs	87	37
Massachusetts	Boston	88	37	Charlestown	89	36
Do	Provincetown	74	38	Williamstown	74	26
Michigan	Mackinaw City	80	28	Thornville	84	34
Do	Escanaba	70	27	Fort Brady	75	25
Minnesota	Saint Paul	75	34	Fort Snelling	81	33
Do	Moorhead	72	23	Northfield	72	32
Mississippi	Vicksburg	91	47	Aberdeen	98	30
Do	Starkville	87	40	Meridian	95	38
Missouri	Saint Louis	90	37	Archie	100	38
Do				Centreville	84	30
Montana	Deer Lodge	87	24	Fort Ellis	73	15
Do	Terry's Landing	81	16	Fort Maginnis	72	13
Nebraska	North Platte	87	31	Utica	95	32
Do	Omaha	87	38	Table Rock	93	30
Nevada	Pioche	84	25	Boca	88	28
Do				Wadsworth	96	32
New Hampshire	Mount Washington	61	11	Grafton	83	23
New Jersey	Sandy Hook	84	40	Newark	86	38
Do	Little Egg Harbor	78	39	Vineland	84	34
New Mexico	Fort Bayard	85	34	Lordsburg	98	50
Do	Santa Fé	78	31	Fort Union	85	21
New York	Rochester	84	32	North Volney	86	35
Do	Oswego	84	36	Johnstown	80	26
North Carolina	Kittyhawk	86	47	Wadesborough	92	40
Do	Charlotte	86	40	Lenoir	85	30
Ohio	Cincinnati	85	35	College Hill	90	40
Do	Toledo	80	32	Wauseon	83	27
Oregon	Portland	84	40	Albany	80	44
Do	Roseburg	84	37	Eola	77	40
Pennsylvania	Pittsburg	90	39	Chambersburg	87	44
Do	Erie	84	32	Grampian Hills	86	28
Rhode Island	Narragansett Pier	75	36	Saint Matthew	96	40
South Carolina	Charleston	91	48	Florence	90	33
Tennessee	Memphis	87	41	Milan	90	38
Do	Chattanooga	87	42	Brownsville	89	38
Do	Knoxville	86	37	Paris	88	38
Texas	Eagle Pass	109	56			
Do	Uvalde	105	54			
Do	Fort Elliott	88	39			
Utah	Salt Lake City	83	33	Ogden	92	38
Do				Coalville	70	16
Vermont				Charlotte	87	39
Do				Strafford	84	30
Virginia	Cape Henry	91	46	Johnsontown	93	51
Do	Chincoteague	78	42	Wytheville	81	36
Washington	Dayton	82	34	Fort Spokane	80	31
Do	Colfax	80	32			
West Virginia				Helvetia	88	34
Wisconsin	La Crosse	78	31	Beloit	84	32
Wyoming	Cheyenne	82	25	Fort Bridger	73	18
Do	Fort Washakie	79	20	Fort Washakie	80	18

Upper Mississippi valley.—From 24° at Cairo, Illinois, on the 7th, to 35° at Dubuque, Iowa, on the 23d.

Missouri valley.—From 35° at Leavenworth, Kansas, on the 5th, and at Huron, Dakota, on the 31st, to 40° at Fort Bennett, Dakota, on the 31st.

Northern slope.—From 33° at Deadwood, Dakota, on the 31st, and at Fort Benton, Montana, on the 20th and 31st, to 44° at Cheyenne, Wyoming, on the 6th.

Middle slope.—From 20° on the summit of Pike's Peak, Colorado, on the 29th and 30th, to 48° at West Las Animas, Colorado, on the 5th.

Southern slope.—From 38° at Coleman City, Texas, on the 1st, and at Fort Concho, Texas, on the 22d, to 39° at Fort Stockston, Texas, on 1st and 21st.

Southern plateau.—From 29° at Fort Grant, Arizona, on the 6th, to 50° at Fort Apache, Arizona, on the 4th, 5th, and 26th.

Middle plateau.—From 35° at Salt Lake City, Utah, on the 27th, to 38° at Pioche, Nebraska, on the 27th.

Northern plateau.—From 33° at Spokane Falls, Washington Territory, on the 6th, to 40° at Fort Missoula, Montana, on the 11th and 12th, and at Eagle Rock, Idaho, on the 21st.

North Pacific.—From 32° at Portland, Oregon, on the 11th and 15th, to 40° at Roseburg, Oregon, on the 29th.

Middle Pacific.—From 26° at San Francisco, California, on the 25th, to 34° at Red Bluff, California, on the 19th, and at Sacramento, on the 27th.

South Pacific.—From 30° at San Diego, California, on the 20th, to 44° at Yuma, Arizona, on the 27th.

FROSTS.

In the various states and territories they were reported as follows:

Alabama.—Green Springs, 22d, 23d; Montgomery, 23d.

Arizona.—Prescott, 9th, 18th, 19th; Fort Apache, 8th, 19th.

Arkansas.—Mount Ida, 22d; Little Rock, 22d; Fort Smith, 22d; Kensett, 22d.

California.—Sacramento, 1st, 2d; Visalia, 15th; Oakland, 18th; Salinas City, 2d, 3d.

Colorado.—West Las Animas, 4th, 26th; Colorado Springs, 10th, 26th; Pike's Peak, 10th, 18th, 20th, 28th, 29th.

Connecticut.—New Haven, 1st; Bethel, 17th, 18th, 19th.

Dakota.—Alexandria, 5th, 11th, 21st; Fort Bennett, 5th, 10th, 12th, 30th; Fort Meade, 10th; Fort Buford, 4th, 7th, 10th; Tobacco Garden, 4th; Yankton, 5th, 21st, 22d; Fort Stevenson, 7th, 10th, 11th, 12th.

Georgia.—Gainesville, 22d, minimum temperature, 34°, the lowest ever observed at this place during May; Madison, 22d, minimum temperature, 31°, coldest May-day ever known at this place; Atlanta, 23d.

Illinois.—Of general occurrence in northern part of the state on the 11th, and throughout the state on 22d, 23d; Elmira, 21st; Rockford, 21st; Morrison, 31st; Collinsville, 31st.

Indiana.—Of general occurrence in the state on 22d and 23d; Wabash, 6th, 11th, 13th, 16th, 24th; Lafayette, 16th, 24th; Indianapolis, 16th; Logansport, 24th; Greenfield, 16th, 31st.

Iowa.—Of general occurrence throughout the state on the 5th, 11th, 21st, 22d, 23d; Nora Springs, 30th; Monticello, 31st; Ames, 31st.

Kansas.—Of general occurrence on 21st, 22d; Holton, 5th, 11th, 31st; Leavenworth, 11th; Clay Centre, 11th, 20th, 29th; Yates Centre, 31st.

Kentucky.—Bowling Green, 22d.

Louisiana.—Shreveport, 22d.

Maine.—Gardiner, 1st, 2d, 5th, 7th, 14th, 16th, 17th, 18th; Orono, 5th, 18th; Portland, 14th; Cornish, 14th, 17th.

Maryland.—Sandy Springs, 1st, 17th, 18th; Woodstock, 30th.

Massachusetts.—Somerset, 1st; Boston, 1st; Westborough, 7th, 14th, 17th, 18th, 19th; Williamstown, 2d, 7th, 12th, 14th, 17th, 18th; Rowe, 12th, 14th, 16th, 17th, 18th; Dudley, 18th.

Michigan.—Of general occurrence in the state on the 1st, 6th, 11th, and 13th; Ionia, 1st, 15th, 23d, 24th; Alpena, 1st, 6th, 12th, 15th, 16th, 17th, 22d, 23d, 29th, 30th; Escanaba, 1st, 15th, 16th; Marquette, 1st to 4th, 9th to 16th, 21st, 22d, 23d; Swartz Creek, 1st, 12th, 16th, 24th; Port Huron, 6th, 16th; Hillsdale, 6th, 31st; Thornville, 1st, 6th, 12th, 15th, 21st; Litchfield, 4th; Traverse City, 10th; Northport, 15th, 16th; Grand Haven, 21st; Lansing, 31st.

Minnesota.—Saint Vincent, 1st, 2d, 3d, 5th, 7th, 8th, 10th to 13th, 28th, 30th; Moorhead, 1st, 2d, 3d, 5th, 7th, 10th to 15th, 21st, 27th to 31st; Saint Paul, 11th, 12th, 21st; Northfield, 11th, 15th, 21st, 22d; Duluth, 11th.

Mississippi.—Vicksburg, 23d; Meridian, 23d; Aberdeen, 23d; Brookhaven, 23d; Columbus, damaging frosts on morning of 23d.

Missouri.—Pierce City, 22d; Archie, 10th, 22d, 31st; Curryville, 22d, 23d; Saint Louis, 22d.

Montana.—Fort Assinniboine, 2d, 3d, 4th, 28th, 29th; Fort Missoula, 3d; Fort Shaw, 3d, 29th; Fort Benton, 3d; Fort Keogh, 4th; New Chicago, 4th, 17th; Fort Ellis, 30th, 31st; Fort Custer, 30th.

Nebraska.—Of general occurrence throughout the state on the 5th and 22d; Red Willow, 3d, 4th, 15th, 30th; DeSoto, 11th; Fremont, 11th; Table Rock, 10th; Nebraska City, 11th; North Platte, 15th, 30th; Peru, 21st; Johnson, 21st.

New Hampshire.—Grafton, 1st, 6th, 7th, 15th, 16th, 17th; Mount Washington, 1st, 2d, 3d, 5th to 18th, 24th, 25th, 28th, 29th, 30th.

New Jersey.—Freehold, 1st, 17th, 18th.

New Mexico.—Santa Fé, 3d, 4th, 8th, 9th, 13th, 17th, 18th, 19th, 26th.

New York.—Of general occurrence on the 12th, 13th, 14th, 17th; Factoryville, 1st, 2d, 18th; Menand station, (near Albany) 1st; Albany, 1st; Rochester, 1st, 16th; White Plains, 9th; Friendship, 16th, 30th; Kiantone, 16th; North Volney, 18th.

North Carolina.—Highlands, 21st, 22d; Charlotte, 23d; Brevard, 22d, 23d, 24th.

Ohio.—Of general occurrence in northern part of the state on 13th, 16th, 17th, 24th; Margaretta, 1st, 7th; Westerville, 6th; Wauseon, 6th, 11th, 12th; Cincinnati, 22d, 23d.

Oregon.—Albany, 14th; Roseburg, 14th.

Pennsylvania.—Of general occurrence in the state on the 17th; at Fallsington on the 1st; Wellsboro', 1st, 12th to 18th, 30th; Grampian Hills, 2d, 12th, 16th; Leetsdale, 12th, 13th, 16th; Pittsburg, 12th, 13th, 16th; Catawissa, 12th; Chambersburg, 16th.

Tennessee.—Murfreesboro', 23d; Nashville, 23d, 24th; Memphis, 22d, 23d; Chattanooga, 23d; Knoxville, 24th.

Utah.—Nephi, 2d, 25th.

Vermont.—Of general occurrence throughout the state on 1st, 7th, 12th, 14th, 16th, 17th; Woodstock, 2d; Strafford, 13th.

Virginia.—Wytheville, 7th; Marion, 12th, 17th; Johnsontown, 18th.

West Virginia.—Helvetia, 2d, 12th, 17th, 24th; Wellsburg, 20th.

Wisconsin.—Of general occurrence on 11th, 21st, 22d, 23d; Embarras, 1st to 4th, 9th to 15th; Franklin, 12th, 13th, 14th, 27th; Columbus, 12th; La Crosse, 15th; Sussex, 21st.

Wyoming.—Cheyenne, 2d, 3d, 4th, 9th, 10th, 14th, 20th, 25th, 26th, 29th, 30th; Fort Washakie, 1st to 6th, 20th, 25th, 26th, 29th, 31st.

The following reports of damage to vegetation by frosts have been received:

Alabama.—Montgomery: light frosts occurred at various points on the 23d, but resulted in no damage to crops.

Georgia.—Augusta, 24th: reports from various points in this state and in South Carolina, state that the young cotton is suffering from the effects of cold weather. Grain and garden crops are generally uninjured, but water-melon vines are seriously damaged.

Illinois.—Noble, Richland county, 22d: a heavy frost and light freeze occurred on the morning of this date. Great fears are entertained for the safety of fruit and vegetables.

Flora, Clay county: a heavy frost occurred on the morning of the 22d. At 5 a. m. the thermometer read 30°. The damage to the fruit crop is considered very heavy, but has not been accurately estimated.

Havana, Mason county, 22d: a heavy frost occurred in this vicinity. The ground froze, and thin ice formed. Serious damage was done to the various kinds of vegetables.

Carrollton, Green county: a heavy frost occurred on the morning of the 22d, and did serious damage in this vicinity.

Jacksonville, Morgan county, 22d: this section was visited by a severe frost on this date. At 5 a. m. the thermometer read 32°, and thin ice formed. All early vegetables and young corn were badly damaged.

Clinton, DeWitt county, 22d: a damaging frost occurred on this date; fruit and all kinds of vegetables were seriously injured. Ice formed to a thickness of one-eighth of an inch.

Pana, Christian county: a heavy frost occurred on the morning of the 22d, seriously damaging tender vegetation.

Waterloo, Montgomery county, 22d: a heavy frost occurred on this date. In many places ice formed to a thickness of one inch. All tender vegetation was killed. The grapes were completely killed; the wheat crop was materially injured, and nearly all the corn crop will have to be re-planted.

Galena, Jo Daviess county, 22d: this section was visited by a severe frost, which did great damage to fruit and vegetables. Ice formed to a considerable thickness.

Windsor, Shelby county: a heavy frost occurred on the morning of the 22d, causing considerable damage to fruit and vegetables.

Ridge Prairie, Saint Clair county: a heavy frost occurred on the morning of the 22d. Ice formed to a thickness of one-eighth of an inch, and the ground was considerably frozen.

Kemper, Jersey county: a severe frost occurred on the morning of the 22d. Ice formed to a thickness of one-fourth inch. Corn and garden vegetables suffered seriously.

Nokomis, Montgomery county, 22d: the heavy frost of last night killed all early vegetables.

Springfield: the frost of the 22d was very damaging to growing crops in central Illinois. In Sangamon county most of the corn will have to be re-planted. Fruit and vegetables were also injured.

Tuscola, Douglas county: the frost which occurred on the 22d, was the severest ever experienced in this county at this season.

White Hall, Greene county: the frost of the 22d was unusually severe for the season. Early vegetables were killed, and it is feared the wheat suffered serious injury.

Greenville, Bond county: a severe frost occurred on the 22d, damaging vegetables and corn. Ice formed one-fourth of an inch in thickness.

Astoria, Fulton county: a very damaging frost occurred here on the 22d. The grape crop in this section was ruined, and other vegetation suffered serious injury.

Cairo, 22d: the temperature fell to 38° on this date, which is the lowest, with one exception (37° in 1875), shown by the records of the Signal Service. In 1875, the minimum temperature occurred three weeks earlier than in the present year.

Maryland.—Sandy Springs, Montgomery county, 17th: the frost of this date caused damage to vegetation in lowlands.

Missouri.—Mine La Motte, Madison county, 22d: a heavy frost occurred on the morning of this date, causing much damage in this locality. Ice formed to a thickness of one-fourth of an inch.

Bonne Terre, Saint Francois county: the heavy frost of the 22d caused serious damage to tender vegetation.

Lebanon, Laclede county: a heavy frost occurred on the 22d. No damage was done to fruit, but young vegetables were seriously injured.

Warrenton, Warren county: tender plants and fruit were injured in this locality by the frost of the 22d.

Pierce City, Lawrence county: the frost of the 22d did great damage to gardens, and it is feared that in the valleys wheat and corn were damaged.

Fredricktown, Madison county, 22d: a heavy frost occurred on this date, seriously injuring garden vegetables.

Springfield: a heavy frost occurred here on the 22d, which seriously damaged garden vegetables.

Curryville, Pike county: the frost of the 22d caused much damage to crops in this locality.

Archie, Cass county: vegetation was seriously injured by the frost of the 22d.

Nebraska.—Lincoln, Lancaster county: slight frosts occurred in this vicinity about the 21st and 22d, but resulted in no serious damage.

North Carolina.—Lenoir, Caldwell county, 23d: the frost of this date killed all tender vegetation, and in some places the cotton crop was injured.

Charlotte: a light frost occurred on the morning of the 23d, causing slight damage to vegetation in the surrounding country.

Wisconsin.—La Crosse, 21st: considerable damage was done to vegetation by the frost of this date.

ICE.

Ice formed in the various states and territories as follows:

Colorado.—Denver, 3d; Fort Garland, 26th.

Connecticut.—Bethel, 29th, 30th.

Dakota.—Fort Bennett, 10th.

Illinois.—Rockford, 21st, 22d; Swanwick, 22d; Mattoon, 22d, 23d. Other instances of ice formation in this state are mentioned in connection with the heavy frosts of the 22d.

Iowa.—Dubuque, 21st.

Maine.—Gardiner, 1st.

Maryland.—Sandy Springs, 17th.

Massachusetts.—Rowe, 12th.

Michigan.—Ionia, 1st, 6th, 11th; Northport, 10th.

Minnesota.—Minneapolis, 22d; Duluth, 11th.

Nebraska.—Genoa, 5th.

New York.—Menand's Station, (near Albany), 1st; Friendship, 17th.

North Carolina.—Lenoir, 23d.

Ohio.—Ruggles, 13th; Wauseon, 13th; Cleveland, 17th.

Pennsylvania.—Pittsburg, 17th.

Vermont.—Woodstock, 14th.

West Virginia.—Wellsburg, 20th.

Wisconsin.—La Crosse, 21st.

PRECIPITATION.

[*Expressed in inches.*]

The distribution of rainfall over the United States and Canada, for the month of May, 1883, as determined from observations taken at more than six hundred stations, is exhibited on chart iv.

In the first column of the following table is given the average May rainfall in the various districts for several years; in the second column is given the average for May, 1883; and the third column shows the excess or deficiency of May, 1883, as compared with the average of previous years:

Average precipitation for May, 1883.

Districts.	Average for May. Signal-Service observations.		Comparison of May, 1883, with the average for several years.
	For several years.	For 1883.	
	Inches.	*Inches.*	*Inches.*
New England	3.36	4.77	1.41 excess.
Middle Atlantic states	2.96	2.38	0.58 deficiency.
South Atlantic states	3.32	6.13	2.91 excess.
Florida peninsula	3.50	3.33	0.17 deficiency.
East Gulf	4.40	4.37	0.03 deficiency.
West Gulf	5.00	3.50	1.50 deficiency.
Rio Grande valley	4.06	1.13	2.93 deficiency.
Tennessee	3.74	4.28	0.54 excess.
Ohio valley	3.85	4.62	0.77 excess.
Lower lakes	2.77	5.79	3.02 excess.
Upper lakes	3.64	4.49	0.85 excess.
Extreme northwest	3.33	1.68	1.65 deficiency.
Upper Mississippi valley	4.49	5.17	0.68 excess.
Missouri valley	4.40	7.43	3.03 excess.
Northern slope	2.79	2.75	0.04 deficiency.
Middle slope	3.34	4.43	1.09 excess.
Southern slope	2.54	4.45	1.91 excess.
Northern plateau	1.02	2.01	0.99 excess.
Middle plateau	1.34	0.65	0.69 deficiency.
Southern plateau	0.22	0.38	0.16 excess.
North Pacific coast	2.38	3.24	0.86 excess.
Middle Pacific coast	0.78	3.11	2.33 excess.
South Pacific coast	0.20	1.00	0.80 excess.
Mount Washington, N. H.	6.39	9.10	2.71 excess.
Pike's Peak, Col.	4.27	2.80	1.47 deficiency.

In Florida, the eastern Gulf states, and northern slope, the monthly rainfall differs but slightly from the May normal. In the middle Atlantic states, extreme northwest, middle plateau, western Gulf states, and Rio Grande valley, deficiencies, ranging from 0.58 to 2.93, have occurred. In all other parts of the country the rainfall is above the average for May. In the lower lake region and Missouri valley, the excess over the average exceeds 3.00; in the south Atlantic states it is 2.91; and in the southern slope, 1.91. A noteworthy feature of the distribution of rainfall for May, is the unusually large excess over the average, in California, where the precipitation has been greater than for any corresponding month since the establishment of the Signal-Service stations. In northern California, the rainfall was about four times the average amount, or an excess of 2.33; and in southern California, an excess of 0.80 occurred, the monthly precipitation being five times as great as the average for May.

The general distribution of rainfall during the month of May, and the districts of maximum departures from the May normal of each year since 1873, are as follows:

Districts.	Maximum departures.	Year.	Remarks.
		1873...	Deficient in the Saint Lawrence valley, lower lakes, and Ohio Valley; excessive in Iowa, Missouri, eastern Kansas, eastern Tennessee, and along the Atlantic sea-board, except near Portland, Maine, and Savannah, Georgia; very large excesses occurred in the Gulf states.
Lower Mississippi valley	− 3.50	1874...	Excessive in the Saint Lawrence valley, New England, and south Atlantic states; deficient in all other parts of the country.
East Gulf	− 2.93		
Ohio valley	− 2.79		
Saint Lawrence valley	+ 1.30		
New England	+ 1.13		
East Gulf	− 3.32	1875...	Excessive over the northern districts from the upper Mississippi valley to the Saint Lawrence valley, and also in the south Atlantic states; deficient in all other districts.
West Gulf	− 2.14		
Tennessee	− 1.78		
Saint Lawrence valley	+ 1.31		
West Gulf	+ 2.65	1876...	Excessive in the middle Atlantic and Gulf states, Tennessee, upper Mississippi valley, upper lake region, and in Minnesota; in the other districts small deficiencies occurred, varying from 0.05 to 0.95.
Tennessee	+ 2.50		
Upper Mississippi valley	+ 1.65		
Ohio valley	− 0.95		
Lower Missouri valley	+ 2.80	1877...	Excessive in the upper Mississippi and Missouri valleys and in Minnesota; deficient in all districts east of the Mississippi river, and also in the west Gulf states. On the Pacific coast, a slight excess occurs at Portland, Oregon, a slight deficiency at Santa Fé, New Mexico, and normal at San Diego, California.
Minnesota	+ 2.30		
Upper lakes	− 2.22		
Saint Lawrence valley	− 2.15		
New England	− 1.95		
West Gulf	+ 1.79	1878...	Normal in Minnesota, the lake region, and south Atlantic states; excessive in the middle Atlantic and Gulf states, the upper Mississippi and lower Missouri valleys; deficient in New England, in the Saint Lawrence, Ohio, and upper Missouri valleys, Tennessee, and California.
Middle Atlantic states	+ 1.16		
Missouri valley	+ 1.13		
New England	− 1.27		
Portland, Oregon	+ 4.63	1879...	Excessive in Minnesota, the upper Mississippi valley, Tennessee, and on the Pacific coast; deficient in the Gulf and Atlantic states, the Saint Lawrence, Ohio, and Missouri valleys, and also in the lake region.
Minnesota	+ 2.95		
New England	− 2.45		
Middle Atlantic States	− 1.95		
Saint Lawrence valley	− 1.78		
Florida	+ 3.14	1880...	Excessive in the Gulf states, Florida, and from Minnesota to the Saint Lawrence valley; normal in Tennessee and in the upper Mississippi valley; deficient from New England to the south Atlantic states, in the Ohio and Missouri valleys, and in California.
East Gulf	+ 2.50		
Ohio valley	− 1.85		
South Atlantic states	− 1.71		
Middle Atlantic states	− 1.57		
New England	+ 2.04	1881...	Excessive in the Missouri valley, New England, and west Gulf states; deficient in all other districts except normal in southern California.
West Gulf	+ 1.64		
South Atlantic states	− 2.37		
East Gulf	− 2.22		
North Pacific	− 1.66		
Ohio valley	+ 4.57	1882...	Deficient from the eastern Rocky mountain slope to the Pacific coast, except a slight excess in Arizona and southern California; excessive in the Rio Grande valley, western Gulf states, extreme northwest, and in all districts east of the Mississippi river, except the south Atlantic states; normal in Florida.
Tennessee	+ 2.98		
Lower lakes	+ 2.75		
Middle Atlantic states	+ 2.15		
South Atlantic states	− 1.38		
Middle slope	− 1.19		

DEVIATIONS FROM AVERAGE PRECIPITATION.

The departures exhibited by the reports from the regular Signal-Service stations are shown in the table of average precipitation for May, 1883. Voluntary observers report the following notes in connection with this subject:

Illinois.—Mattoon, Coles county: monthly rainfall, 4.14, or 0.70 below the May average of the last four years.

Table of Excessive, Greatest, and Least Monthly Rainfalls.

Station.	Specially heavy.			Largest monthly.	Smallest monthly.	
	Date.	Amt.	Duration	Amount.	Station.	Amt.
Alabama.					*Arizona.*	
Mobile	29	5.62	16 hours	8.51	Yuma	0.00
Mount Vernon Barracks	30	2.83		8.23	Maricopa	0.00
Arkansas.					Prescott	0.15
Mount Ida	19	3.00		10.30	Casa Grande	0.24
California.					Fort Verde	0.27
Alta				6.07	Willcox	0.33
Oakland	6	2.60			Tucson	0.35
San Francisco	4, 5	2.09			Phœnix	0.44
Benicia Barracks	5, 6	2.08			*California.*	
Canada.					Indio	0.00
Montreal				6.23	White Water	0.00
Colorado.					Ravenna	0.16
Denver	8	2.02			Goshen	0.45
Connecticut.					*Louisiana.*	
New Haven	22	3.32			Alexandria	0.41
New London	22	2.84			*Nevada.*	
Dakota.					Carlin	0.00
Rapid City	2	2.95		11.02	Elko	0.01
Do	7	2.08			Palisade	0.15
Do	17, 18	4.40			Pioche	0.33
Deadwood	2	2.18		10.33	Beowawe	0.38
Do	17, 18, 19	5.65			Reno	0.40
Fort Meade	9, 10	2.40		9.61	*New Mexico.*	
Do	18	3.26			Deming	0.00
Yankton				8.78	Lordsburg	0.00
Smithville				6.29	Fort Union	0.10
Florida.					*North Carolina.*	
Fort Barrancas	30	3.50		7.82	Highlands	0.25
Pensacola	29, 30	5.31		7.47	Brevard	0.45
Key West	11	4.85	11 hours		*Texas.*	
Limona	1	2.25			El Paso	0.02
Georgia.					Uvalde	0.17
Savannah	1	3.21			Weimar	0.19
Illinois.					San Antonio	0.29
Chicago				7.32	*Utah.*	
Ames				6.64	Blue Creek	0.00
Springfield	25	2.38		6.61	Kelton	0.10
Peoria				6.54	Promontory	0.25
Rockford				6.39	Terrace	0.50
Riley	10	2.42		6.18	*Virginia.*	
Polo				6.14	Snowville	0.50
Aurora				7.23		
Marengo	10	2.42		6.18		
Sycamore	9	2.55		8.55		
Griggsville	25	2.57		6.60		
Greenville	17	2.25		6.25		
Golconda	20	3.33		7.13		
Mascoutah	19	2.00		6.20		
Do	25	2.20				
Anna				6.64		
Indiana.						
Bluffton				7.60		
Logansport	18, 19	2.91		7.51		
Wabash				6.24		
Richmond				6.04		
Laconia	20	2.20				
Indian Territory.						
Fort Supply				7.84		
Iowa.						
Des Moines	13	2.03		9.76		
Indianola	25	2.11		7.83		
Logan				7.60		
Dubuque	9	2.10		7.13		
Humboldt				7.12		
Ames				7.11		
Fort Madison				7.10		
Kansas.						
Rolling Green				10.10		
Belle Plain				9.25		
Emporia	13	3.88		8.90		
Pretty Prairie	16, 17	3.58		7.94		
Lawrence	13	3.50		7.63		
Leavenworth	13	2.44		7.33		
Do	24, 25	2.57				
Yates Centre	12, 13	2.77		7.05		
Do	24, 25	2.33				
Levy				6.80		
Fort Leavenworth	25	2.80		6.65		
Fort Scott	25	2.03		6.54		
Wellington				6.53		
Topeka	25	2.18		6.42		
Holton	13	2.00		6.38		
Oxford				6.02		
Clay Centre	16, 17	2.02				
Milford	13	2.00				
Kentucky.						
Bowling Green	21	2.22				
Louisiana.						
New Orleans	26	2.41				
Maine.						
Eastport	22, 23	3.54		6.60		
Orono	24	2.98				
Gardiner	23	2.06				
Massachusetts.						
Amherst	22	3.68		6.20		
Boston	22	3.00				
Westborough	22	2.76				
Dudley	22	2.66				
Michigan.						
Coldwater	9, 10	2.85		10.75		
Hillsdale				8.62		
Marshall				8.41		
Mendon				8.16		
Traverse City				6.67		
Ionia				6.43		

Table of Excessive, Greatest, and Least Monthly Rainfalls.—Continued.

Station.	Specially heavy.			Largest monthly.	Smallest monthly.	
	Date.	Amt.	Duration.	Amount.	Station.	Amt.
Michigan—Continued.						
Kalamazoo				6.38		
Lansing				6.31		
Litchfield				6.20		
Grand Haven				6.02		
Missouri.						
Corning				7.68		
Ironton				7.30		
Harrisonville				7.25		
Savannah				6.50		
Centreville				6.43		
Miami				6.29		
Pleasant Hill				6.05		
Nebraska.						
Sutton	13	3.00		14.18		
Do	17	2.75				
Do	25	2.80				
Omaha	8	2.98		11.29		
Do	13	2.48				
Peru	12, 13	4.20		9.35		
Do	16	2.00				
Do	17	3.00				
Clear Creek	12, 13	2.21		8.22		
Nebraska City	7	2.00		8.15		
Do	13	2.14				
Johnson	13	2.30		6.55		
Fort Niobrara				6.42		
De Soto	8	2.27				
Red Willow	13	2.25				
Utica	13	2.16				
New Hampshire.						
Mount Washington				9.10		
Antrim	23	2.00				
New Jersey						
Paterson	21, 22, 23	4.39				
Sandy Hook	21, 22	3.15	13 hours			
Freehold	21, 22	2.37				
New York.						
Oswego				7.03		
Friendship				6.80		
North Volney				6.70		
Fort Niagara				6.68		
Rochester				6.53		
Buffalo	21, 22	2.67		6.45		
New York City	21, 22	2.31				
Palermo	24	2.25				
Fort Columbus	21, 22	2.10				
Flushing	23	2.00				
North Carolina.						
Portsmouth	1, 2	4.56		10.57		
Do	27	4.18				
Hatteras	1, 2	4.16		7.81		
Do	27	2.67				
Kittyhawk				7.76		
Fort Macon	1, 2	2.29		6.67		
Do	27	2.95				
Chapel Hill	22, 23	2.00				
Nova Scotia.						
Halifax				8.61		
Ohio.						
Cleveland				6.50		
Jacksonburg	21	5.10		6.30		
Do	28	2.25				
Columbus				6.38		
North Lewisburg				6.05		
Pennsylvania.						
Wellsborough	21	2.18		8.81		
Leetsdale				6.53		
Franklin				6.38		
Erie				6.29		
Fallsington	21	2.01				
South Carolina.						
Charleston	1, 2	6.38		8.62		
Yamassee				7.82		
Tennessee.						
Memphis	30	2.93	8 hours	6.55		
Ashwood	31	2.10				
Texas.						
Houston				6.08		
Galveston				6.01		
Fort Elliott	16, 17	3.83				
Fort Concho	19	3.24	8 hours			
Coleman City	19	2.22	2 h. 25 m.			
Indianola	20	2.02	35 min.			
Brackettville	17	2.00				
Vermont.						
Newport				7.87		
Charlotte				6.90		
Wisconsin.						
Franklin				9.36		
Columbus				8.25		
Sussex	9	2.00		7.89		
Madison				7.62		
Ripon	9, 10	2.55		6.50		
Beloit				6.42		

Anna, Union county: monthly rainfall, 6.64, is 0.99 above the May average of the last eight years.

Riley, McHenry county: monthly rainfall, 6.18, is 2.85 above the May average of the last twenty-two years.

***Indiana.*—Vevay, Switzerland county: monthly rainfall, 3.49, is 1.40 below the May average of the last eight years.**

Wabash, Wabash county: monthly rainfall, 6.24, is 2.18 above the May average of the last seven years.

Logansport, Cass county: monthly rainfall, 7.51, is 3.39 above the May average of the last twenty-four years. During that period the largest May rainfall, 8.24, occurred in 1880; the smallest, 1.20, occurred in 1862.

Kansas.—Lawrence, Douglas county: monthly rainfall, 7.63, is 3.56 above the May average of the last fifteen years. The total rainfall for the five months ending May 31, 1883, is 14.07, or 2.25 below the average of the corresponding months of the fifteen years.

Yates Centre, Woodson county: monthly rainfall, 7.05, is 0.53 above the May average of the three preceding years. Rainfall for the spring months of 1883 is 0.33 below the average of the same periods for the three preceding years.

Independence, Montgomery county: monthly rainfall, 5.00, is 0.17 above the May average of eleven years. The largest May rainfall of that period, 10.06, occurred in 1878; the smallest, 0.88, occurred in 1874.

Wellington, Sumner county: monthly rainfall, 6.53, is 1.12 above the May average of the four preceding years. The total rainfall for the five months ending May 31, 1883, is 13.83, or 3.52 above the average of the corresponding months of the last four years.

Maine.—Gardiner, Kennebec county: monthly rainfall, 5.02, is 1.33 above the May average of the last forty-seven years.

Maryland.—Fallston, Hartford county: monthly rainfall, 1.08, is 1.99 below the May average of the last twelve years. The largest May rainfall of that period, 6.47, occurred in 1873; the smallest was that of May, 1883.

Michigan.—Lansing: monthly rainfall, 6.31, is 1.20 above the May average of the last four years.

Missouri.—See report of Professor Nipher, Director of the "Missouri Weather Service," under "notes and extracts."

New Hampshire.—Grafton, Grafton county: monthly rainfall, 2.97, is below the May average.

New York.—Palermo, Oswego county: monthly rainfall, 5.87, is 3.04 above the May average of the last thirty years. The largest May rainfall of that period, 6.50, occurred in 1864; the smallest, 0.30, occurred in 1870.

North Volney, Oswego county: monthly rainfall, 6.70, is 4.13 above the May average of the last eleven years, and is the largest May rainfall of that period; the smallest, 1.10, occurred in 1876.

Ohio.—Wauseon, Fulton county: monthly rainfall, 5.97, is 2.27 above the May average of the last thirteen years. The largest May rainfall of that period, 6.25, occurred in 1880; the smallest, 1.14, occurred in 1877.

Texas.—New Ulm, Austin county: monthly rainfall, 3.07, is 2.26 below the May average of the last eleven years. The largest May rainfall of that period, 12.25, occurred in 1882; the smallest, 2.94, occurred in 1873.

Vermont.—Woodstock, Windsor county: monthly rainfall, 3.14, or 0.32 above the May average of the last fourteen years. The largest rainfall of that period, 4.43, occurred in 1882; the smallest, 0.62, occurred 1879.

Virginia.—Wytheville, Wythe county: monthly rainfall, 1.50, is 1.51 below the May average of a period of twenty years.

Variety Mills, Nelson county: monthly rainfall, 1.70, is 0.91 below the May average of the last four years.

West Virginia.—Helvetia, Randolph county: monthly rainfall, 4.38, is 0.04 below the May average of the last seven years.

Wisconsin.—Beloit, Rock county: monthly rainfall, 6.42, is the largest May rainfall since 1858.

HAIL.

Arkansas.—Eureka Springs, Carroll county: this place was visited by a violent hail-storm at 5.30 p. m. on the 18th. The hailstones were very large and specimens weighing from six to eight ounces were numerous. Great damage was done to the windows, skylights and roofs of buildings.

California.—Visalia: the storm of the 6th was of unusual severity in this vicinity. The lightning struck in many places, the most serious damage being done near Tulare. Hail accompained the storm, causing considerable damage. In the western part of Frazier valley the crops were totally destroyed. The width of the hail-storm was from six to eight miles wide, and its northern limit was about five miles south of Visalia.

Colorado.—Denver, 8th: a severe hail-storm began at 9.45 a. m. Scarcely a residence or public building in the city escaped without injury. Vegetables and flower gardens in this city and vicinity were completely destroyed. The hailstones covered the ground in some parts of the city to a depth of twelve inches, the largest stones being one inch in diameter. The losses sustained by ranchmen in the immediate vicinity of Denver is very heavy. The damage resulting from the storm is estimated at $75,000.

Dakota.—Huron, 9th: large hail fell on this date, eighteen miles north of this place, causing slight damage.

Illinois.—Cairo: the hail-storm which passed over Mound City, Pulaski county, during the night of the 14th–15th, was the severest ever experienced in that locality. More than five hundred panes of window-glass were broken, and vegetable gardens were badly damaged. Hailstones were collected that measured nine inches in circumference.

Polo, Ogle county: on the 18th, hailstones the size of hickory-nuts fell at this place, covering the ground to a depth of one inch.

Indiana.—Carrollton, Hancock county: the hail-storm of the 15th did considerable damage by breaking windows. The fruit and wheat crops were damaged to some extent.

Indianapolis: large hail fell from 5.20 to 5.30 p. m. of the 14th. The hailstones consisted of transparent ice and were of irregular shapes. At Maywood, five miles southwest of Indianapolis, the hail covered the ground to a considerable depth.

Iowa.—Nora Springs, Floyd county, 6th: at 7.15 p. m. of this date hailstones fell, measuring from one to one and one-half inches in diameter.

Muscatine, Muscatine county: A severe hail-storm occurred in Lake township on the 9th, the hailstones being two inches in diameter.

Michigan.—Grand Haven: during the thunder-storm of the 9th, hailstones the size of hazel-nuts fell from 5.45 to 5.47 p. m.

Port Huron, 14th: during the storm of this date hailstones the size of pigeons' eggs fell, covering the ground to a depth of two inches.

Missouri.—Booneville, Cooper county: at 3.30 p. m. of the 8th, a wind and rain storm, accompanied by considerable hail, visited this place. No serious damage was done in this locality.

Cape Girardeau, Cape Girardeau county: at 5:30 p. m. of the 14th, a severe hail-storm visited this place, the hailstones being about the size of hickory-nuts. Considerable damage was done to the fruit-trees, and a number of skylights were broken. Clarksville, Pike county: at 5.30 p. m., on the 18th, the most severe hail-storm ever experienced at this place, passed over this locality. The storm was of about thirty minutes' duration, a greater part of which time hailstones fell as large as hens' eggs and some were found to measure seven and eight inches in circumference. Great damage was done to roofs, skylights, windows, and street-lamps. The young fruit and foliage of trees were destroyed, gardens were entirely ruined, and the wheat and corn crops were seriously injured. A number of persons suffered bodily injury from the falling hailstones. The storm came from the southwest and passed off to the east.

Nebraska.—Crete, Saline county: during the afternoon of the 1st, a violent hail-storm visited this place. Some of the hailstones were very large, the average being one inch in diameter. The storm continued for nearly twenty minutes, doing damage to all kinds of vegetation. The hail clogged all of the water-courses, causing the water to overflow many cellars and basements.

Ohio.—Dayton: a hail-storm of unprecedented severity in this locality occurred on the afternoon of the 14th. The hail-

stones measured almost one inch in diameter, covering the streets in places to depths of several inches.

Pennsylvania.—Scranton: a severe hail-storm visited this section during the evening of the 4th. A large amount of property was damaged. Several buildings were struck by lightning during the storm.

Tennessee.—Jackson, Madison county: during the night of the 29–30th, the country southwest of this place was visited by a most severe hail and rain storm. It came from the northwest, striking near Gadsden, Crockett county. All cotton, corn, and fruit in the path of the storm, for miles, were destroyed. Birds and poultry were killed in large numbers by hailstones, which were as large as hens' eggs, and covered the ground to a depth of three inches.

Texas.—Galveston: reports from Terrell, Kaufmann county, state that a severe hail-storm occurred at that place during the evening of the 14th. The hailstones were unusually large, some of which penetrated the roofs of buildings.

Wisconsin.—Sussex, Waukesha county: at 10.50 p. m. of the 2d, a severe hail and thunder storm of five minutes' duration passed over this station. On the north and east sides of the buildings the hailstones covered the ground to a depth varying from four to six inches, the largest measuring one inch in length and one-half inch in diameter. At Waukesha, nine miles south, the storm was more severe, damaging buildings and orchards to the extent of $10,000.

Beloit, Rock county: at 10.40 p. m. on the 25th, hailstones fell measuring three inches in circumference.

A heavy hail-storm occurred at Mukwanago, Waukesha county, on the 25th, causing considerable damage.

Hail-storms of less violence were reported from the various states and territories as follows:

Arizona.—Prescott, 7th, 18th.

Colorado.—Colorado Springs, 8th; Fort Garland, 17th; West Las Animas, 28th.

Dakota.—Fort Randall, 2d; Morriston, 7th; Fort Lincoln, 9th, 26; Fort Yates, 10th; Tobacco Garden, 16th; Fort Meade, 26th, 29th.

District of Columbia.—West Washington, 5th, 14th, 21st; Washington, 21st.

Idaho.—Fort Lapwai, 7th.

Illinois.—Chicago, 3d; Polo, 2d, 3d, 18th; Anna, 15th; Edgington, 18th; Bunker Hill, 19th; Morrison, 27th.

Indiana.—Indianapolis, 14th; Griffin Station, 14th, 19th, 26th; Noblesville, 14th; Logansport, 14th, 19th, 27th; Wabash, 14th, 19th; Vevay, 27th, 28th.

Iowa.—Des Moines, 3d; Muscatine, 3d, 9th; Humboldt, 7th, 8th, 10th, 13th; West Bend, 9th; Ames, 9th, 28th; Nora Springs, 6th; Indianola, 6th; Davenport, 18th; Burlington, 27th; Dubuque, 27th.

Kansas.—Leavenworth, 9th; Holton, 13th; Lawrence, 13th; Emporia, 13th; Topeka, 13th; Fort Scott, 13th.

Kentucky.—Bowling Green, 14th.

Maine.—Eastport, 10th.

Maryland.—Sandy Springs, 5th.

Massachusetts.—Williamstown, 23d.

Michigan.—Milwaukee, 2d, 18th; Swartz Creek, 3d, 14th; Lansing, 3d, 14th; Grand Haven, 9th; Fort Brady, 9th; Ionia, 14th; Hillsdale, 14th; Port Huron, 14th; Detroit, 21st, 27th; Traverse City, 18th; Northport, 25th.

Montana.—Fort Maginnis, 23d; Fort Keogh, 25th.

Nebraska.—Omaha, 1st, 3d; Sutton, 2d; De Soto, 2d, 14th, 24th; Clear Creek, 1st, 8th, 13th; Milford, 7th; Genoa, 2d, 7th, 8th, 9th, 17th; Stockham, 9th, 13th, 20th; North Platte, 8th, 26th; Red Willow, 31st.

New Hampshire.—Antrim, 10th.

New Jersey.—Freehold, 8th.

New Mexico.—Fort Union, 6th, 16th; Santa Fé, 17th.

New York.—Albany, 10th; Menand Station, (near Albany), 10th, 28th; Friendship, 14th; North Volney, 28th; Palermo, 28th.

North Carolina.—Brevard, 15th; Charlotte, 5th; Weldon, 15th; Kittyhawk, 15th; New River, 15th.

Ohio.—Toledo, 14th; Cleveland, 14th; Margaretta, 14th; Westerville, 14th, 27th; Bethel, 21st, 27th; Cincinnati, 27th; Jacksonburg, 27th, 28th; College Hill, 29th.

Oregon.—Albany, 17th; Portland, 17th; Roseburg, 17th.

Pennsylvania.—Fallsington, 8th; Wellsboro', 10th, 14th; Leetsdale, 14th; Williamsport, 24th.

South Carolina.—Charleston, 12th.

Tennessee.—Memphis, 9th, 14th; Knoxville, 15th, 29th.

Texas.—Indianola, 24th; Eagle Pass, 24th.

Vermont.—Lunenburg, 28th.

Virginia.—Wytheville, 5th; Variety Mills, 5th; Fort Myer, 5th, 21st; Norfolk, 14th, 15th; Johnsontown, 27th.

Wisconsin.—Embarras, 2d; Sussex, 2d, 18th; Ripon, 6th; La Crosse, 6th, 27th; Beloit, 18th, 25th.

Wyoming.—Fort Washakie, 1st.

In the following table are shown the greatest and least numbers of rainy (upon which rain fell) and cloudy days; the greatest and least percentages of mean relative humidity; and the highest and lowest dew-point means, as reported from the various districts, for the month of May, 1883:

Districts.	Rainy days.	Cloudy days.	Rel. humidity.*	Dew-point.
			Percentages.	°
New England	From 10 to 18	From 2 to 10	From 65.8 to 81.8	From 38.5 to 46.8
Middle Atlantic states	" 6 " 16	" 3 " 12	" 52.1 " 81.5	" 42.5 " 56.4
South Atlantic states	" 7 " 15	" 1 " 13	" 56.8 " 81.5	" 50.8 " 61.3
Florida peninsula	" 6 " 9	" 1 " 7	" 68.7 " 70.3	" 62.7 " 68.3
East Gulf	" 7 " 9	" 1 " 5	" 68.0 " 72.0	" 55.7 " 63.5
West Gulf	" 5 " 13	" 1 " 8	" 63.6 " 76.9	" 55.6 " 67.9
Ohio valley	" 15 " 17	" 9 " 12	" 61.7 " 67.7	" 45.2 " 51.9
Tennessee	" 9 " 19	" 5 " 9	" 65.0 " 67.0	" 50.6 " 56.1
Lower lakes	" 18 " 24	" 10 " 16	" 64.8 " 73.8	" 40.8 " 44.3
Upper lakes	" 13 " 25	" 7 " 18	" 61.5 " 75.3	" 30.6 " 41.7
Extreme northwest	" 7 " 12	" 3 " 7	" 60.0 " 71.8	" 34.7 " 38.2
Upper Mississippi valley	" 16 " 23	" 6 " 16	" 60.4 " 71.1	" 38.9 " 47.7
Missouri valley	" 15 " 17	" 7 " 15	" 62.0 " 73.8	" 41.2 " 46.3
Northern slope	" 5 " 18	" 2 " 16	" 58.5 " 85.4	" 30.7 " 42.8
Middle slope	" 5 " 14	" 3 " 10	" 46.0 " 57.1	" 31.7 " 44.2
Southern slope	" 4 " 9	" 2 " 6	" 63.5 " 64.9	" 56.5 " 56.9
Southern plateau	" 1 " 7	" 0 " 6	" 29.7 " 41.9	" 20.7 " 35.2
Middle plateau	" 2 " 6	" 3 " 5	" 40.6 " 46.5	" 31.2 " 31.3
Northern plateau	" 5 " 13	" 3 " 11	" 51.1 " 68.7	" 29.3 " 43.9
North Pacific	" 9 " 13	" 7 " 13	" 63.8 " 77.7	" 43.0 " 46.1
Middle Pacific	" 9 " 12	" 5 " 12	" 59.6 " 75.8	" 40.6 " 55.6
South Pacific	" 0 " 8	" 0 " 6	" 41.8 " 71.7	" 46.6 " 51.0
Mt. Washington, N. H.	Twenty-one	Two	88.4	30.8
Pike's Peak, Col.	Thirteen	Six	84.6	15.6

* Relative humidity corrected for altitude.

SNOW.

The dates on which snow is reported to have fallen in the various states and territories are as follows:

California.—Fort Bidwell, 13th, 17th.

Colorado.—Pike's Peak, 3d, 8th, 9th, 10th, 12th, 13th, 17th to 20th, 24th, 25th, 29th, 30th; Denver, 29th.

Dakota.—Fort Sully, 1st; Fort Meade, 1st to 4th, 10th, 13th, 14th; Fort Hale, 1st, 2d; Huron, 1st, 2d, 3d; Fort Stevenson, 1st; Rapid City, 2d, 13th; Deadwood, 2d, 3d, 4th, 13th, 16th, 29th, 30th; Fort Yates, 3d, 10th; Fort Bennett, 2d, 3d, 4th; Fort Sisseton, 2d, 3d; Alexandria, 3d; Tobacco Garden, 5th, 6th; Fort Totten, 6th.

Idaho.—Eagle Rock, 3d; Miner's Camp, 1st.

Illinois.—Chicago, 21st; Tuscola, 21st; Champaign, 21st.

Indiana.—Griffin station, 21st, 22d; Indianapolis, 21st.

Maine.—Eastport, 15th.

Michigan.—Marquette, 2d, 3d, 9th, 12th, 20th; Port Huron, 2d; Fort Brady, 3d, 9th, 12th, 20th; Alpena, 3d, 20th; Detroit, 21st, 22d; Thornville, 22d.

Minnesota.—Moorhead, 1st; Duluth, 1st, 6th.

Montana.—Snow fell generally throughout the territory on the 1st and 2d; Fort Keogh, 3d; Fort Ellis, 3d, 4th, 18th, 28th, 29th; Fort Shaw, 4th, 5th, 9th; Fort Benton, 4th; Helena, 4th; Fort Assinniboine, 5th; Fort Maginnis, 13th, 14th.

Nebraska.—Fort Niobrara, 2d.

Nevada.—Pioche, 1st, 7th, 18th.

New Hampshire.—Summit of Mount Washington, 14th, 15th.

New Mexico.—Santa Fé, 17th.

New York.—Rochester, 22d.

Ohio.—Bethel, 21st; Wauseon, 21st, 22d; Cincinnati, 21st; Columbus, 21st; Toledo, 21st, 22d; Springfield, 21st.

Tennessee.—Chattanooga: snow was reported to have fallen on Lookout mountain during the morning of 22d.

Utah.—Salt Lake City, 2d.

West Virginia.—Helvetia, 22d.

Wyoming.—Fort Bridger, 2d, 29th; Cheyenne, 2d, 3d, 9th, 25th, 29th; Fort Washakie, 2d, 12th, 28th, 29th.

LARGEST MONTHLY SNOWFALLS.

[*Expressed in inches.*]

The following are the largest monthly snowfalls reported from the various states and territories during the month:

California.—Cisco, 55; Emigrant Gap, 33; Summit, 33.

Colorado.—Pike's Peak, 36 on the ground at end of the month, 28 of which fell during the month of May; Fort Lewis about 7; Fort Garland about 4.

Dakota.—Deadwood, about 30; Huron, 6.7.

Indiana.—Griffin's station, about 4; Rising Sun, 3.

Montana.—Helena, 5.7; Fort Maginnis, 6.2.

Nevada.—Truckee, 9.5; Boca, 6; Toana, 5.

New Hampshire.—On the summit of Mount Washington, 6.4, trace remaining on the ground at end of the month.

Ohio.—Toledo, 6.

Wyoming.—Fort Washakie, 16; Cheyenne, about 9; Fort Bridger, 7.8.

SLEET.

Fort Brady, Michigan, 2d, 10th.
Fort Niobrara, Nebraska, 3d.
North Lewisburg, Ohio, 21st.
Toledo, Ohio, 21st.
Saint Paul, Minnesota, 2d.
Mount Washington, New Hampshire, 5th to 8th, 10th to 24th, 25th.
Fort Totten, Dakota, 6th.

COTTON REGION REPORTS.

Temperature and rainfall observations in the cotton districts were continued during the month of May, 1883. The averages for the various districts, as determined from the observations made by the stations published in the REVIEW for April, 1882, are given in table below.

Meteorological Record of the Cotton Districts for the month of May, 1883.

Districts.	Average rainfall in inches.	Temperature.		Extremes.	
		Mean of the maxima.	Mean of the minima.	Highest.	Lowest.
		°	°	°	°
New Orleans	3.96	84.8	62.9	100	36
Savannah	3.60	84.4	59.5	97	33
Charleston	5.06	82.7	57.8	96	40
Atlanta	2.58	80.7	56.5	92	34
Wilmington	2.33	82.6	54.6	92	33
Memphis	4.59	80.3	55.4	93	37
Galveston	2.18	86.6	66.2	99	42
Vicksburg	2.63	82.8	59.4	95	38
Montgomery	2.60	84.2	56.0	94	31
Augusta	2.70	83.5	59.1	95	31
Little Rock	4.34	82.0	54.6	93.3	33
Mobile	2.94	85.3	58.6	98	39

WINDS.

The prevailing directions of the wind for the month of May, 1883, at the Signal-Service stations are shown on chart iii. by arrows flying with the wind. On the California coast, the prevailing winds were westerly; in the north Pacific coast region, northerly; in the Gulf states, southerly and southeasterly; along the Carolina coast, southwesterly, except northeast at Kittyhawk; on the middle Atlantic coast, easterly and southerly; New England coast, southerly and southwesterly; lower lake region, westerly; in the upper lake region, upper Mississippi and Missouri valleys, they were mostly from the north and northwest.

TOTAL MOVEMENTS OF THE AIR.

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England	Block Island, R. I.	9,725	New London, Conn.	4,527
Middle Atlantic states	Del. Breakwater, Del.	11,980	Lynchburg, Va.	3,496
South Atlantic states	Hatteras, N. C.	13,978	Augusta, Ga.	2,801
Florida peninsula	Punta Rassa	7,264	Sanford	4,105
East Gulf	Starkville, Miss.	6,327	Montgomery, Ala.	3,591
West Gulf	Indianola, Tex.	10,856	Little Rock, Ark.	4,325
Ohio valley	Louisville, Ky.	6,818	Pittsburg	3,968
Tennessee	Nashville	5,549	Chattanooga	4,549
Lower lakes	Rochester, N. Y.	9,687	Cleveland, Ohio	6,783
Upper lakes	Milwaukee, Wis.	9,653	Marquette, Mich.	6,532
Extreme northwest	Moorhead, Minn.	9,227	Saint Vincent, Minn.	6,857
Upper Mississippi valley	Saint Louis, Mo.	9,362	Dubuque, Ia.	4,023
Missouri valley	Huron, Dak.	8,944	Omaha Neb.	6,626
Northern slope	North Platte, Neb.	9,488	Deadwood, Dak.	2,846
Middle slope	Fort Elliott, Texas.	11,738	Denver, Colo.	4,883
Southern slope	Fort Concho, Texas.	8,119	Colman City, Texas.	6,918
Southern plateau	Santa Fé, N. M.	9,362	Tucson, Ariz.	3,215
Middle plateau	Pioche, Nev.	6,412	Salt Lake City, Utah.	3,350
Northern plateau	Eagle Rock, Idaho	7,252	Lewiston, Idaho	2,481
North Pacific	Portland, Oregon	4,284	Olympia, Wash. T.	1,408
* Middle Pacific	San Francisco, Cal.	7,176	Sacramento, Cal.	5,207
South Pacific	San Diego, Cal.	5,086	Visalia, Cal.	3,102

* No record at Cape Mendocino, Cal.

On the summits of Mount Washington, New Hampshire, and Pike's Peak, Colorado, the total movements of the air were 25,410 and 16,762 miles, respectively.

HIGH WINDS.

On the summit of Mount Washington, maximum velocities of fifty miles per hour or more were of daily occurrence, with the exception of the 1st, 4th, 5th, 15th, 18th, and 21st. The highest velocities recorded at this station as follows: 78 nw., 8th; 76 nw., 9th; 84 sw., 10th; 90 nw., 11th; 76 nw., 13th; 76 sw., 29th; maximum for the month, 96 sw., 31st. The following high velocities were reported from Pike's Peak, Colorado: 68 sw., 1st; 52 nw., 4th; 64 sw., 5th; 51 sw., 6th; 78 sw., 8th (maximum for month); 52 nw., 23d; 58 sw., 24th; 50 nw., 26th; 56 nw., 27th; 56 nw., 28th; 64 n., 31st.

Other stations reporting velocities of fifty miles or more per hour, are as follows: Fort Assinniboine, Montana, 52 w., 31st; Mackinaw City, Michigan, 52 e., 10th; Delaware Breakwater, Delaware, 50 n., 15th; Hatteras, North Carolina, 56 ne., 2d; Portsmouth, North Carolina, 64 ne., 2d.

LOCAL STORMS.

The most violent local storms and tornadoes of the month occurred in connection with the passages of the barometric depressions traced as numbers v. and vi. on chart i. Those which were associated with number v. were most violent in eastern Kansas and Missouri, and occurred on the afternoon of the 13th, while the centre of depression was near central Nebraska. The tornadoes occurring in connection with number vi. were numerous and severe. They occurred during the afternoon and evening of the 18th in the states of Illinois, Indiana, Iowa, Missouri, and Wisconsin. The barometric depression mentioned in connection with these storms, which are described in detail under "areas of low-pressure," were traced as follows:

Number v. was central in eastern Colorado on the morning of the 13th, and moved in an easterly direction, disappearing off the middle Atlantic coast on the afternoon of the 15th. Number vi. was first located near central Wyoming on the morning of the 17th; it moved northeastward over the upper lakes and Canadian provinces, and was last observed on the morning of the 21st over the Gulf of St. Lawrence.

Brief description of the local storms and tornadoes of May, 1883, are given below, under the heading of the various states in which they occurred.

Alabama.—A storm of great violence passed to the north and west of Headland, Henry county, during the evening of the 20th, destroying a number of buildings and blowing down many trees and fences.

Arkansas.—Eureka Springs, Carroll county, 18th: a tornado occurred during the evening of this date, first striking a point about five miles southeast of this place, where it cut a path, one-fourth of a mile in width, through a dense forest, and destroyed several buildings.

Fort Smith: a severe storm swept over this city during the morning of the 29th, breaking down and uprooting many shade trees. The southern hotel, one of the finest structures in the city, was unroofed.

California.—Stockton, San Joaquin county: the most severe thunder-storm experienced here for years occurred on the 5th.

Germantown, Colusa county: during the storm of the 4th and 5th, 1.75 inches of rain fell. This storm resulted in damage to the harvested hay, but was of great benefit to the grain crops.

San Leandro, Alameda county, 5th: much damage has been done to the roads and grain crops in this vicinity by the recent rains.

Dakota.—Fort Stevenson: this place was completely isolated from the outside world by the storm of the 9th and 10th. The telegraph lines were prostrated for miles and all travel was obstructed, causing serious interruption to business. Several mills were compelled to shut down, it being impossible to do hauling over the roads.

Illinois.—Chicago: the storm on the afternoon of the 9th was very severe north of this city. At South Evanston a church was blown from its foundation and completely wrecked. Several other buildings in Evanston and South Evanston were damaged.

Sterling: a severe storm passed over the southern part of Whiteside county on the afternoon of the 9th. A large number of buildings were blown down or damaged. In Sterling, many windows were broken by the hail accompanying the storm.

Hillsboro', Montgomery county: the tornado, which passed through the outskirts of Hillsboro' on the evening of the 18th was first seen as a dense black cloud, coming from a point almost due southwest. While its path, in places, was zigzag, its general course was in a direct line nearly northeast. The fact that its path through this vicinity was exactly in a line with those of the tornadoes which passed near Nokomis, in this county, and Staunton, Macoupin county, leads to the conclusion that these storms are identical. If this conclusion is correct, a section of country for a distance of fifteen miles, over which it passed, was left untouched, between the place of its last appearance in Macoupin county and the point first touched in Montgomery county. It left the earth again about three miles northeast of Hillsboro' and next touched at Nokomis, about ten miles distant, where it made several successive bounds, destroying two dwellings and several barns, and then entirely disappeared. As the tornado swept by Hillsboro', its velocity supposed to be not less than forty miles per hour, it was accompanied by a deafening roar. At a distance of one-fourth of a mile on either side of the cloud, there was a tremendous suction or side draft of the air toward the centre. The width of the path varied with the nearness of its approach to the ground, being thirty rods wide in some places, while in others it was not more than ten rods. Where the pendent stem or small end of the funnel-shaped cloud swept along, it left a path not more than four or five feet wide, which was plainly marked. No houses in this vicinity were struck by the centre of the storm, consequently the loss of life was not as great as it would otherwise have been. A number of stones, of peculiar formation and shapes uncommon in this region, were showered upon a farm near its track. The iron suspension bridge of the Indianapolis and Saint Louis railroad was blown away at 9.55 p. m., resulting in the complete wreck of the train due at Hillsboro' at 10.03 p. m.

Nokomis, Montgomery county: a violent storm visited this vicinity between 10 p. m. and midnight of the 18th, causing serious losses.

Grafton, Jersey county: the tornado of the 18th resulted in the destruction of much property and loss of life at this place. Large stones were lifted from Grafton bluffs and thrown with great force into the Mississippi river, and were also strewn along the track of the Wabash railway for several miles. A car loaded with stone weighing 42,000 pounds, was lifted from the track and the stones were scattered in various directions.

Pierson station, Piatt county: a violent tornado visited this county at about 12.15 a. m. of the 19th. It moved in a northeasterly direction, destroying much property in its path. Trees of various sizes were broken or twisted off, some of which were three feet in diameter. The storm was accompanied by constant and vivid lightning.

Clinton, De Witt county: a severe storm passed over this vicinity during the night of 18–19th, doing great damage to property, and causing loss of life. The cloud was funnel-shaped and revolved with great rapidity. Near Kinney, the storm was accompanied by hailstones as large as hickory-nuts. Reports from Staunton, Macoupin county, state, that at 10 p. m. of the 8th, a tornado passed about three miles east of that place, demolishing residences and doing great injury to the orchards in that vicinity. About twenty-five persons were injured and one was killed.

Harvard, McHenry county, 18th: shortly before 6 p. m. a dark cloud, accompanied by a roaring sound, was observed over Chemung, a village near this place. In a moment a funnel-shaped cloud formed and swept over the village, completely destroying a large number of buildings and killing several persons. The tornado passed eastward, doing considerable damage at Belvidere and Lawrence.

Chicago, 19th: the storm of last night caused considerable damage in various parts of this city. A great many signs were blown down and much window-glass was broken. Several buildings were blown down.

Gillespie, Macoupin county, 18th: at 9 p. m. a violent tornado passed from southwest to northeast, between this place and Carlinville, causing loss of life and great destruction to property.

Springfield, 18th: at 7.10 p. m. a tornado occurred about three miles south of the centre of this city, and moved in a northeasterly direction. Property valued at $75,000 was destroyed in this vicinity; four persons were killed and several more or less seriously injured. At Round Prairie, a small settlement four miles east of this city, the storm was also very severe.

Pesotum, Champaign county: a destructive storm occurred at this place at 11.30 p. m. of the 18th, causing much damage to property in this vicinity.

Decatur, Macon county: between 9 and 10 p. m. of the 18th a tornado passed over the northwestern part of this county, sweeping away many houses and barns. No serious damage was done in this city.

Virginia, Cass county: a tornado occurred in this vicinity at 8 p. m. of the 18th. Littleberry, a village of three hundred inhabitants, seven miles south of this place, was almost entirely destroyed. The track of the storm was about one-half mile in width. Six persons were killed and a large number wounded.

Mount Pulaski, Logan county: during the night of the 18th this vicinity was visited by a violent tornado. It first struck near Cornland, where a dwelling was destroyed. From this point the storm moved eastwardly with great violence and destroyed nearly everything in its path. The storm-cloud seems to have lifted from Lake Fork to Salt creek, passing off into De Witt county.

Pekin, Tazewell county: during the severe storm of the 18th a number of out-buildings, fences, and trees were blown down. At Manito nearly all of the windows were broken by the hail which accompanied the storm.

Jacksonville, Morgan county: this section was visited by the most destructive storm ever known here during the evening of the 18th. At Greasy Prairie, eleven miles south of this place, a large number of farm-houses were destroyed and four persons were killed. At Woodlawn, where a violent tornado occurred three years ago, the railroad depot was blown down; cars were blown from the track and destroyed, while in places the railroad track was partly torn up. At Leitenburg, nine miles north of Jacksonville, the storm passed over the most thickly settled part of the place, destroying and injuring many buildings. At this place six persons were killed and fifteen were

injured. The storm extended as far south as Litchfield, near which place a railroad bridge was blown away and a train thrown into a ravine. Great damage was done in the vicinity of Murrayville, where many dwellings were wrecked and several lives lost.

Edwardsville, Madison county: this city and immediate vicinity was visited by a violent tornado during the evening of the 18th. Only one life was lost in this locality, but a large amount of property was destroyed. The storm came from the southeast, first appearing about two and one-half miles distant; and the width of its path was from six hundred to eight hundred feet. The total damage to property is estimated at $50,000.

Alton, Madison county, 19th: the storm of last night resulted in no serious damage at this place, but at Grafton, Jersey county, a few miles northward, all of the derricks of the Grafton Stone Quarry company were destroyed, together with five engines and several houses. The storm was also severe at Edwardsville, Madison county. At Shipman, Macoupin county, a great deal of property was destroyed. This storm seems to have come directly from the west. It first appeared at Jonesburg, Montgomery county, Missouri, where it blew down several houses and caused loss of life.

Mason City, Mason county: about 9 p. m. of the 18th a tornado, coming from the south, struck a point about three miles southeast of this place, blowing down and unroofing buildings. Two persons were killed and several wounded at this place by the falling timbers.

Petersburg, Menard county, 18th: at 9 p. m. a tornado struck this county about four miles north of Tallula; thence it passed northeasterly across the county, doing great damage to buildings and orchards and causing loss of life.

Up to midnight of the 19th the number of deaths caused by the tornadoes, occurring on the afternoon of the 18th, in the various counties in Illinois, aggregated sixty-three.

Collinsville, Madison county, 25th: a tornado of small extent occurred five miles west of this place. Its track was about seventy-five feet in width and one mile in length. The damage was slight.

Cairo, 28th: a storm occurred here on this date, the wind reaching a velocity of forty miles. A few shade trees, chimneys, &c., were blown down.

The following report was published in the Saint Louis "Globe Democrat," June 2d, 1883: "Litchfield, Illinois, June 1st.—Information was received to-day from a party at Millersville, Christian county, that a book containing the name of J. F. Blackburn, of Litchfield, was picked up about a mile east of that place in the track of the late cyclone. The book was undoubtedly carried from Woodsboro', where Mr. Blackburn's house was demolished, a distance of over thirty miles from the place where it was found."

Indiana.—Franklin, Johnson county, 14th: at 7.30 p. m. a severe storm of wind and hail passed over Amity, three miles south of this place, causing great damage to property. Several dwellings were moved from their foundations and a large number of small buildings and fences were destroyed.

During the night of the 14th a tornado swept across the country about six miles north of Connersville, Fayette county, striking the village of Waterloo, where only three houses were left standing. An iron bridge over White Water river was ruined. In the southern part of Wayne county, much damage was done. The storm passed into Preble county, Ohio, unroofing houses and barns, and causing damage estimated at $70,000. Further eastward in Montgomery county, there was a severe hail-storm, which did great damage to vegetation, and especially to the fruit crop.

Muncie, Delaware county: during the night of the 14th a severe storm visited the western part of this county, doing great damage by demolishing barns, unroofing houses and destroying valuable timber.

Indianapolis, 14th: this vicinity was visited by a severe storm at 6 p. m. No serious damage was caused at this place, but at Southport, six miles south, two churches, a school-house, and other buildings were blown down. The damage will amount to $10,000. West of Southport, the tornado divided into two parts, and again united after passing a distance of one mile.

La Fayette, Tippecanoe county: a severe wind and rain storm occurred during the night of the 18th, causing much damage to buildings, fruit trees, and growing crops in this vicinity.

Wabash: at 4. p. m. of the 19th a violent tornado from the southwest passed over this place. Its track was very narrow, and within it many buildings were unroofed and trees blown down. The tornado was of short duration, but it was one of the severest ever experienced here, and caused serious damage in this city and vicinity.

Clay City, Clay county: at 5 p. m. of the 28th a violent tornado occurred in this vicinity. No serious damage was done at this place, but at Neal's Mill a dwelling was totally destroyed, killing six persons. In a neighboring settlement several houses were blown down and five persons were killed. This tornado proved very destructive in Decatur, Owen, Johnson, and Shelby counties.

At 6 p. m. of the 28th a violent storm with heavy rain struck the town of Edinburg, Johnson county. The wind blew with great force for ten minutes, during which time several buildings were badly injured, and other damage done.

Iowa.—Dubuque: a severe rain and hail storm occurred in this vicinity during the afternoon of the 9th. Telegraph lines, fences, &c., were prostrated, one house was blown down, and a steamer and several barges were blown from their moorings. Considerable damage was done by flooding cellars and basements.

Cedar Rapids, Linn county: during the evening of the 9th a tornado passed through the western part of this county, in the vicinity of Fairfax, demolishing several and unroofing a large number of buildings.

Davenport, 18th: during a storm on the afternoon of this date, a part of the roof of the Phœnix mills was carried away; signs and chimneys were blown down in various parts of the city.

Kansas.—At about 5 p. m. of the 13th, a heavy storm passed over Troy, Doniphan county. It came from a southwesterly direction, and was observed several minutes before it struck the town. One residence was demolished, and the telegraph poles along the Saint Joe railroad were blown down, obstructing the track and causing delay of travel.

Wyandotte, 13th: at 4.30 p. m. the most violent tornado which has ever visited Wyandotte county, crossed the Kansas river near Muncie. It travelled in a northeasterly direction across the county, the width of its path varying from three hundred to four hundred feet. Large forest trees were twisted off and many buildings were completely demolished.

Atchison: the storm of the 13th, which proved so destructive at Wyandotte and Kansas city, was discernible from this place and caused much alarm. Very heavy rain fell here, accompanied by thunder and occasional hail.

Wichita, Sedgwick county: the severe storm of the 13th caused large losses of sheep and cattle by drowning. Many bridges were washed away, and the streams were swollen to higher points than have been known for years.

McPherson, McPherson county: a violent storm occurred twelve miles west of this place on the 24th. The wind reached an estimated velocity of eighty-five miles per hour, blowing down buildings and doing other damage.

Michigan.—Detroit, 10th: a severe wind and rain storm passed over this city at 3.40 p. m., damaging the roofs of buildings and blowing down signs, etc. The damage was almost entirely confined to the north side of Grand River avenue for a distance of two squares. The storm was very severe along the river front below the Michigan Central railroad property, where fences and numerous out-houses were blown down.

Lansing: about 1 p. m. of the 10th, a severe thunder-storm passed over this place. The wind reached a velocity of seventy-two miles per hour, blowing down chimneys, unroofing

buildings, and doing other damage. During the storm the telegraph and telephone wires were much disturbed, the lightning playing freely over the wires inside the buildings, melting the coils around the magnets and discharging with loud reports.

White Pigeon, Saint Joseph county, 14th: a violent windstorm occurred at 4 p. m., during which a school building was blown down, killing one of the pupils and injuring several others.

Sturgis, Saint Joseph county: a tornado struck this place about 3.30 p. m. of the 14th. It came from a southeasterly direction and passed through the outskirts of the town. The path of the storm was about one-half mile in width, within which many buildings were demolished. Four persons were killed about two miles from this place. The storm, which was accompanied by very heavy rain and hail, was also very severe in Branch county.

Minnesota.—Duluth: a severe and destructive storm visited this city and vicinity between 1 and 2 p. m. of the 18th. The storm lasted but a few minutes. One dwelling and a large number of out-houses were blown down. The damage caused by the storm is estimated at $2,000.

Missouri.—Jefferson City: the storm of the afternoon of the 9th did considerable damage to the growing crops and fences in the western and southwestern sections of Cole county. The storm was particularly severe near Russellville. Very large hail accompanied the storm.

Kansas City: at 4.30 p. m. of the 13th, a tornado struck this city, coming from a southwesterly direction. It is reported that before the tornado reached this city, it came from a northerly direction, striking Wyandotte county, Kansas, about ten miles before reaching this place. In Wyandotte county the tornado divided, one part going northeastward through Clay county, Missouri, and the other passing near the asylum for the blind, north of Wyandotte, and turning south and east, partly wrecked that city. Argentine and other suburbs of Wyandotte were completely destroyed. It lifted from the earth and cleared West Kansas City, striking again upon the crest of the bluff at Sixteenth and Jefferson streets. Trees as large as a man's body were snapped off, and heavy timbers and roofs were carried long distances. The track of the tornado was from one hundred and fifty to two hundred yards wide, and from its point of contact with the top of the bluff, it pursued a northeasterly course. In some instances substantial brick structures were demolished, while small frame buildings escaped without injury. Above Wyandotte the storm was more severe than in Kansas City. The other tornado crossed the river about one mile north of Wyandotte, pursuing a northeasterly course. This storm appears to have been more violent than the one which struck Kansas City. Four persons were killed and about two hundred houses of various sizes were demolished. The damage done in Kansas City and vicinity is estimated at $300,000. At Liberty, Clay county, the storm did considerable damage; many buildings were blown down or otherwise damaged.

Troy, Lincoln county: a tornado struck this place at 3 p. m. of the 13th. It was of short duration and was not especially severe. The storm apparently started about two miles west of this place, and caused but slight damage in its course.

Cameron, Clinton county, 13th: the country fifteen miles north of this place was visited by a destructive storm about 5 p. m. The storm pursued a northwesterly course, and resulted in great damage. Houses and trees were blown down and many horses and cattle were killed.

Macon, Macon county: about 8 p. m. of the 13th, this town was visited by a severe storm, which caused great damage to all kinds of property. No lives were lost in this immediate vicinity, but at other points several persons were killed.

Pattonsburg, Daviess county: a tornado passed south and east of this town about 5 p. m. of the 13th, blowing down buildings, fences, trees, &c.

St. Joseph: reports from Whitesville, Andrew county, state that a storm passed over that place on the evening of the 13th, destroying several houses, barns, and orchards in that vicinity. At Liberty, Clay county, several houses were destroyed or badly damaged, and in an adjacent county many farm-houses and other buildings were blown down.

Springfield: a severe wind and hail storm visited this vicinity during the night of the 13th; the hailstones were very large and broke much window-glass in the city. Near Cave Spring, fifteen miles northwest, much fencing was destroyed, but no other damage occurred.

Omaha, Putnam county, 17th: soon after 6 p. m. a tornado struck the southwestern part of this town. Its path was about one hundred and fifty yards wide, within which many trees over one foot in diameter were broken off close to the ground.

The storms which visited Howell county, during the 18th and 19th, did great damage to farms and other property. Bridges and embankments on the Kansas City, Springfield and Memphis railroad were washed away or badly damaged. Every house in the town of Moody was blown down. The tornado swept across Maries county levelling everything in its track, which was about one hundred yards wide. In Miller county the storm was also very severe.

Berger, Franklin county, 18th: At 7 p. m. a tornado visited this section, causing damage to the extent of several thousand dollars.

Wellsville, Montgomery county: a tornado passed over the southern part of this county about 7 p. m. of the 18th, totally destroying six dwellings and one mill. One person was killed and several wounded. The damage in this vicinity will aggregate $30,000.

Forestel, Saint Charles county: a violent tornado passed south of this place during the evening of the 18th. It was of very short duration, and was accompanied by a roaring sound. The storm pursued a zigzag course from southwest to northeast, the width of its path being from two hundred to three hundred yards. Great damage was done along the course of the storm, from Tuque post office, Warren county, to Wintzville, Saint Charles county.

A tornado passed over Dog Prairie, Saint Charles county, during the evening of the 18th, doing damage to the extent of more than $30,000.

Reports from Marquand, Madison county, state that a violent tornado visited that place at 5 p. m. of the 18th, causing a large amount of damage.

Carthage, Jasper county: at 7.40 p. m. of the 18th, a tornado struck the town of Oronogo, a few miles west of here, and in a few minutes destroyed nearly all the buildings in the town. Six persons were killed, and thirty-three more or less seriously wounded. The damage at Oronogo is estimated at $75,000. Webb City, Joplin, and Carthage escaped with but little damage. The storm passed up Spring River valley, its track being about two hundred yards wide. At Cartersville, two miles southeast of Oronogo, a church was completely wrecked, and several buildings were blown down.

Montana.—Butte City, Silver Bow county: a tornado passed over a section of this country, eight miles south of this place, on the 15th, destroying houses, trees, and fences. Five hundred feet of basin-fluming, thirty feet above the ground, were blown down, seriously injuring six men.

Nebraska.—Omaha: At 6 p. m. of the 17th, a tornado passed over the southern outskirts of this city. Before the approach of the tornado there were observed to the southward of the city two funnel-shaped clouds, travelling rapidly to a converging point. When the clouds met, a loud noise, resembling an explosion, was heard. The track of the storm was not continuous, the tornado-cloud only touching in places in a direction from southwest to northeast. A few out buildings and fences were blown down, entailing a loss of about $400.

Valparaiso, Saunders county: during the afternoon of the 17th a tornado destroyed a number of houses and injured several persons at this place. The storm passed about one-quarter of a mile east of the town at 4.15 p. m., reaching Valley, Douglas county, at about 5 p. m.

Nevada.—Carson City: from 11.20 a. m. to 1.20 p. m. of the 11th, the most violent thunder-storm that has been known for many years prevailed at this place. The storm was accompanied by hail and an unusual electrical display.

New Jersey.—Keyport, Monmouth county: considerable damage was done in this vicinity by the storm of the 8th.

Paterson: a severe storm visited this place during the evening of the 8th, unroofing a number of mills and doing other damage. Several persons were injured.

The storm on the afternoon of the 21st was the most violent ever known in the eastern part of Monmouth county. It was particularly severe along the coast, and great damage was done at Highlands, Seabright, and Long Branch. The swollen streams did great injury to the country bridges, and the growing crops were badly damaged by the heavy rain. At Seabright a residence valued at $30,000 was struck by lightning and totally destroyed, and at Long Branch a church was badly damaged by lightning.

New Mexico.—Santa Fé, 12th: a violent whirlwind with a funnel-shaped cloud passed through this city on this date. Two houses were unroofed, trees were blown down, and other damage done.

New York.—New York City: A storm of considerable severity occurred in this vicinity on the afternoon of the 8th. A number of chimneys, signs, &c., were blown down in this city and in Brooklyn, and considerable damage was done by lightning.

Constantia, Oswego county: at 6 p. m. of the 10th this village was visited by one of the worst storms ever known in this locality. The storm was of less than ten minutes duration, during which time many buildings were unroofed, and chimneys, fences, and trees were blown down. At Gaysville, a small settlement near here, the storm was very violent. Large trees, barns, and out-houses were blown down.

The storm of the 21st was one of the severest that has visited Long Island for many years. The thunder and lightning was almost incessant, and the rain fell in torrents for nearly five hours, flooding cellars in some localities and badly washing the road-beds. The lightning caused considerable damage at various points, several barns and dwellings being totally destroyed.

Ohio.—Frederickstown, Knox county: a destructive storm swept over this place during the afternoon of the 14th, destroying and unroofing buildings.

At Bridgeport, Belmont county: during the storm of the 28th the bridge across the Little Miami river was torn from its piers and wrecked, and a flour mill was unroofed. In Butler county, a large number of barns were unroofed and a few dwellings were demolished. This storm did considerable damage in Shelby, Bartholomew, Decatur, and Owen counties, Indiana.

Lebanon, Warren county: during the evening of the 28th, a tornado passed near this place. It passed in a northeasterly course to the village of Genntown, where it blew down all of the fences and trees, and unroofed a number of barns and dwellings. A substantially built cottage was carried a distance of forty feet and dashed to pieces. After reaching Genntown the course of the storm changed to the eastward. Its track was about one hundred and twenty yards in width near Lebanon, but it increased about three-eighths of a mile at Genntown. The storm was attended throughout its course by rain and hail.

Pennsylvania.—Danville, Montour county: the most violent wind storm which has visited this vicinity for many years occurred on the 8th. Many houses were unroofed or otherwise injured, and two persons were killed. Trains were delayed on account of the washing away of embankments and culverts.

Philadelphia, 9th: reports from Easton state that the storm of the 8th, in the Lehigh and Wyoming valleys, was the severest ever known in eastern Pennsylvania. Between Penn Haven, Carbon county, and Hazleton, Luzerne county, a clear path was cut through the forest for a distance of two thousand feet. A large amount of damage was done to various kind of property.

Greensburg: about 5 p. m. of the 10th, a tornado of very short duration occurred about two miles southeast of this place. Many trees were broken off or uprooted, and several buildings were unroofed. The tornado was accompanied by heavy hail.

Erie: a violent wind storm began at 4.45 a. m. of the 21st, and continued during the day, reaching a maximum velocity of forty miles, and doing considerable damage to the wharves, buildings, and telegraph lines. Several fish houses were destroyed, and fishing nets, valued at $3,000, were lost.

Pottstown, Montgomery county: a severe storm visited this place at 7 a. m. of the 22d, and continued for one hour; several buildings were damaged by lightning during the storm. This storm was also severe at Wilkesbarre, where a number of houses were struck by lightning.

Tennessee.—Chattanooga: a tornado is reported to have occurred at a point about thirty miles north of this place about 4 p. m. of the 20th, blowing down two buildings and damaging others.

Texas.—Denison: a tornado struck this city at 9 a. m. of the 17th. It came from a southwesterly direction, and caused damage to the extent of $50,000 in this vicinity. About twenty buildings were destroyed and the fruit crop was nearly ruined.

Indianola: a severe storm, accompanied by hail, occurred on the 20th, during which the wind attained a velocity of eighty miles per hour, damaging buildings and uprooting trees. Over two inches of rain fell in thirty-five minutes.

Wisconsin.—Waukesha, Waukesha county: a tornado of great severity visited this locality on the evening of the 3d, blowing down many barns and fences. The damage in this vicinity is estimated at from $7.000 to $10.000. Farmers from the surrounding country report great damage to out-buildings and fences.

Janesville, Rock county: a storm of wind, rain, and hail visited this city during the evening of the 18th. No buildings were blown down, but many windows were broken by the hail. In the town of Plymouth, ten miles southwest of this place, the damage to buildings by this storm is estimated at $20.000.

Beloit, Rock county: a violent wind storm passed over the Norwegian settlement, twelve miles north of this place, on the evening of the 9th. Two large barns were blown down and several other buildings were unroofed.

Rock, Rock county: this town was visited by a tornado at 4 p. m. of the 9th. The path of the storm was about forty rods wide and about three miles in length. The damage to buildings and orchards in this vicinity is estimated at $10,000.

A tornado struck the northern part of the city of Racine at about 7 p. m. of the 18th. The storm was very violent in this vicinity, causing damage estimated at more than $60,000. Twenty-five persons were killed, one hundred were injured, and about one hundred and fifty houses were destroyed. Had the storm struck the central part of the city the losses would have been much greater. The storm pursued a northeasterly course, its track being about five hundred yards wide and about one and one-half miles in length. Some of the houses in the path of the storm were blown from twenty to thirty feet from their foundations; others were completely demolished and some only partially destroyed. As the tornado moved from the city over Lake Michigan a most remarkable spectacle was witnessed. The whirling columns of air seemed like great wreaths of smoke, bearing with them spiral columns of water.

Watertown, Jefferson county, 18th: the storm of this date caused damage to the extent of several thousand dollars in this county.

Sussex, Waukesha county: a whirlwind passed over this village on the 25th, completely demolishing a small barn. No other damage was done.

NAVIGATION.

STAGE OF WATER IN RIVERS.

No sudden or dangerous rises have occurred in any of the rivers during the month.

The Mississippi river was at its highest stage on the 1st, at all stations, except Keokuk, Iowa, and Saint Louis, Missouri. At Keokuk the river rose above the danger-line on the 14th, and continued to rise slowly, reaching its highest point, twenty-one inches above the danger-line, on the 18th. On the 21st, it was again below the danger-line. At New Orleans, Louisiana, the range for the entire month was only four inches.

The Ohio and Missouri rivers remained low during the month, but reached their highest stages between the 23d and 30th.

The highest and lowest stages of water observed at the Signal-Service stations during the month of May, 1883, are shown in the following table:

Heights of rivers above low-water mark, May, 1883.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.	
		Date.	Height.	Date.	Height.
Red River:	Ft. In.		Ft. In.		Ft. In.
Shreveport, La	29 9	1	21 10	29, 30	13 6
Arkansas:					
Little Rock, Ark	30 0	24	15 0	19	2 0
Fort Smith, Ark	.....	22	10 6	17	*—2 11
Missouri:					
Yankton, Dakota	20 0	23	8 3	22	3 0
Omaha, Nebr	16 0	25	14 1	4 to 11	7 2
Leavenworth, Kans	21 0	27	16 10	8, 9, 10	8 11
Mississippi:					
Saint Paul, Minn	14 6	1	10 6	31	7 2
La Crosse, Wis	18 0	1	9 9	22	6 6
Dubuque, Iowa	21 10	1	16 4	29, 30, 31	10 5
Davenport, Iowa	15 0	1, 2	13 2	30, 31	8 5
Keokuk, Iowa	14 6	18	16 3	31	12 3
Saint Louis, Mo	30 0	22	26 6	1	18 7
Cairo, Ill	40 0	1	41 7	17	23 8
Memphis, Tenn	34 0	1	32 11	19	18 5
Vicksburg, Miss	41 0	1	42 3	25, 26	37 7
New Orleans, La†	—2 6	2 to 8 14, 15 19 to 24	— 1 — 2	27 to 31	— 1 6
Ohio:					
Pittsburg, Pa	30 0	23	13 4	13, 14	3 3
Cincinnati, Ohio	50 0	29	29 11	18	11 0
Louisville, Ky	24 0	1, 30	11 8	19	6 7
Cumberland:					
Nashville, Tenn	42 0	1	17 3	30	5 0
Tennessee:					
Chattanooga, Tenn	33 0	1	11 0	31	3 11
Monongahela:					
Pittsburg, Pa	29 0	23	13 4	13, 14	3 3
Savannah:					
Augusta, Ga	30 0	25, 26, 31	6 6	2	15 6
Willamette:					
Portland, Oreg	.....	1	7 6	26, 27	16 7
Sacramento:					
Red Bluff, Cal	.....	6	6 0	3, 4	2 6
Sacramento, Cal	.....	24	20 8	4	16 3
Mobile:					
Mobile, Ala	.....	10	18 4	31	15 4
Colorado:					
Yuma, Arizona	.....	31	21 11	1, 2	17 5

†Below high-water mark of 1874. *Below bench mark.

FLOODS.

The floods occurring during May were generally of local character and were confined to creeks and small streams. They were very destructive in Dakota, in the vicinity of Deadwood, where they were due mostly to the melting of winter snowfall in the mountains and hills of that region. With this exception, the damage resulting from floods during the month has been comparatively small.

Alabama.—Mobile: a very heavy rain storm occurred on the 19th, during which 5.50 inches of rain fell. The streets in many parts of the town were flooded, the water covering some to depths of six feet. No serious damage resulted.

Arkansas.—Eureka Springs, Carroll county: the heavy rain accompanying the storm of the 18th, flooded the yards in this vicinity, carrying away 5,000 feet of lumber. Leatherwood Creek valley was flooded to a depth of fifteen feet, damaging the Eureka Springs railroad.

Dakota.—Deadwood: On the 15th and 16th, the temperature rose rapidly, and on the 17th a warm rain set in. These conditions caused the snow in the mountains to melt rapidly, which resulted in sudden rises in all streams in this vicinity. Whitewood creek, a stream running through Deadwood, rose with great rapidity, and at 4 p. m. the water was within four inches of the flooring of the Lee-street bridge. At 7.45 p. m. the bridge gave way, after which over seventy houses were washed away in a few hours. The rain continued during the 18th, on which date only three houses were left standing on Lee street. Many houses on Upper Sherman street, from Lee street to Chinatown, were washed away. On the 18th a six story brick school-house and a new church were wrecked, and three persons were drowned. The water began to subside at 1 p. m. The wagon roads for miles around were impassable, and the Military telegraph lines were prostrated. The damage to Deadwood and vicinity is estimated at more than $1,000,000. Deadwood is situated at the junction of the Whitewood and Deadwood gulches, and numerous other gulches emptied their accumlating water from the mountains into these two main gulches, making a volume of water that rushed down Whitewood with resistless force. Central City, Anchor City, and Golden Gate are on Deadwood gulch, above Deadwood city. The greater portion of Central City was above the flood, but Anchor City and Golden Gate there was no escape, the gulch there being not over six hundred feet wide.

The main residental portion of Deadwood is from one hundred to three hundred feet above the gulch, and the main business portion is also above the danger line. The portion destroyed was occupied by cheap tenement houses, second-class hotels, laundries, small traders, &c. Some of the buildings are built over the stream, which at its ordinary stage is only a few feet wide, but during the flood it increased in width to fifty feet. This locality is generally avoided, however, its danger being recognized. When the flood came, timely warning was given by means of the telephone system which exists in the hills, and the most valuable articles were removed by the residents. All of Whitewood (or Pennington), about five miles south of Deadwood, was washed away, and also the greater part of Crook City and Spearfish. Operations are suspended in all of the mines in the vicinity of Deadwood, the Homestake mine being nine feet under water.

Meade, 20th: the damage caused between this place and Deadwood is so great as to render it impossible to make an estimate as to its extent. Men who were sent out to repair telegraph lines returned without success and narrowly escaped drowning.

Rapid City: this city was entirely surrounded by water on the 20th, and the Rapid City valley, more than forty miles in length, all of which had been seeded, was entirely submerged and many houses were washed away. The amount of the damage done in the valley cannot be accurately estimated, but it is very great.

Illinois.—Rockford: the heavy rain-storm of the evening of the 9th resulted in great damage to cellars and basements throughout the city. Reports from the surrounding country state that stock and the newly planted fields suffered great damage.

Elgin: this region was visited during the night of the 9th by a very heavy rain-storm. Railway traffic was considerably interrupted, owing to numerous wash-outs. The Fox river rose five feet, damaging the water power at this point to the extent of $7,000.

Missouri.—West Plains, Howell county: the heavy rains of the 18th and 19th flooded a part of Howell valley, where bridges, embankments, and fences were washed away. At Augusta considerable damage was done by washing away embankments and culverts.

Nebraska.—Omaha, 8th: the heavy rain of this date caused the sewers in the city to overflow, resulting in damage to the extent of several thousand dollars. More than two inches of rain fell in three hours.

HIGH TIDES.

Cape Lookout, North Carolina, 2d: very high tide, covering the whole island, and drowning a large number of sheep and cattle. High tides also occurred at this station on the 3d, 4th, 6th, 7th, 8th, 15th, 18th, 19th, 20th, 22d.

Punta Rassa, Florida, 21st.

ICE IN RIVERS AND HARBORS.

Lake Erie.—Buffalo, New York: the lake at this place was clear of ice on the 5th.

Lake Superior.—Duluth, Minnesota, 2d: the barge "Osceola" departed on this date, being the first boat to leave this port for the lower lakes.

Marquette, Michigan, 5th: the barge "Osceola" was the first boat of the season to arrive from Duluth, Minnesota. The passenger steamers "Saint Paul" and "Winslow" arrived on the 10th, and reported having encountered considerable ice. On the 17th, the inner harbor became filled with ice. On the 18th, the captain of the steamer "Toledo" reported that the ice extended along the shore of the lake from this place to the mouth of Saint Mary's river, and in places it extended lakeward for a distance of fourteen miles.

Devil's lake.—Fort Totten, Dakota: the lake became clear of ice at this place on the 13th.

TEMPERATURE OF WATER.

The temperature of water as observed in rivers and harbors at the Signal Service stations, with the average depth at which the observations were made, are given in the following table. In this table is also shown the mean temperature of the air at the various stations, and the monthly ranges of water temperature. The smallest monthly ranges are as follows: Portland, Maine, 3°.7; Eastport, Maine, 4°.6; Smithville, North Carolina, 5°; Duluth, Minnesota, 6°.5; Pensacola, Florida, 6°.5. The largest are: Buffalo, New York, 23°.5; Cedar Keys, Florida, 20°.5; Alpena, Michigan, 20°.4; New Haven, Connecticut, 17°.5; Toledo, Ohio, 17°.1.

Temperature of Water for May, 1883.

STATION.	Temperature at bottom.		Range.	Average depth, feet and inches.		Mean temperature of the air at station.
	Max.	Min.				
	°	°	°	ft.	in.	°
Atlantic City, New Jersey	58.6	47.6	11.0	6	5	56.7
Alpena, Michigan	58.4	38.0	20.4	11	2	44.6
Augusta, Georgia	79.0	62.0	17.0	8	1	70.5
Baltimore, Maryland	66.0	54.0	12.0	9	8	64.0
Block Island, Rhode Island	54.6	43.7	10.9	8	11	52.6
Boston, Massachusetts	59.1	45.7	13.4	21	3	55.5
Buffalo, New York	59.0	35.5	23.5	10	7	50.0
Cedar Keys, Florida	86.0	65.5	20.5	10	10	75.1
Charleston, South Carolina	73.1	63.0	10.1	39	11	70.8
Chicago, Illinois*	54.7	49.2	5.5	7	4	52.1
Chincoteague, Virginia	71.0	55.0	16.0	5	8	60.0
Cleveland, Ohio	56.7	44.4	12.3	14	0	54.2
Detroit, Michigan	55.0	45.0	10.0	23	7	54.0
Delaware Breakwater, Delaware	61.4	49.5	11.9	9	3	58.6
Duluth, Minnesota	44.0	37.5	6.5	14	10	45.5
Eastport, Maine	41.7	37.1	4.6	15	7	47.4
Escanaba, Michigan	50.0	37.5	12.5	15	0	45.1
Galveston, Texas	79.0	71.0	8.0	12	8	75.6
Grand Haven, Michigan	63.7	50.1	13.6	19	0	50.6
Indianola, Texas	81.5	73.6	7.9	9	4	76.2
Jacksonville, Florida	81.0	72.0	9.0	18	0	73.9
Key West, Florida	86.4	78.2	8.2	17	1	79.5
Mackinaw City, Michigan†	43.8	32.8	11.0	13	0	44.7
Marquette, Michigan	43.0	35.0	8.0	9	10	44.0
Milwaukee, Wisconsin	53.0	42.6	10.4	8	0	49.6
Mobile, Alabama	77.0	69.5	7.5	17	0	72.9
New Haven, Connecticut	65.7	48.2	17.5	15	1	56.5
New London, Connecticut	56.0	45.0	11.0	12	7	56.6
New York City	61.5	46.7	14.8	17	4	59.0
Norfolk, Virginia	72.0	58.0	14.0	16	11	66.3
Pensacola, Florida	78.6	72.1	6.5	17	9	72.2
Portland, Maine	44.7	41.0	3.7	18	11	54.9
Portland, Oregon	59.8	47.6	12.2	62	5	57.4
Provincetown, Massachusetts	59.0	44.5	14.5	14	0	53.9
Punta Rassa, Florida	87.5	76.1	11.4	11	1	75.3
Sandy Hook, New Jersey	56.0	46.2	9.8	1	5	58.6
San Francisco, California	61.8	52.6	9.2	29	4	56.8
Savannah, Georgia	76.8	66.9	9.9	12	4	72.7
Smithville, North Carolina	71.0	66.0	5.0	10	0	68.5
Toledo, Ohio	64.3	47.2	17.1	11	7	55.8
Wilmington, North Carolina	74.5	60.0	14.5	13	0	69.0

* No observations from 1st to 14th inclusive.
† Observations interrupted by ice on the 1st, 2d, and 4th.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for May, 1883, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 89.54 per cent. The percentages for the four elements are: weather, 93.28; direction of the wind, 90.01; temperature, 89.06; barometer, 85.74 per cent. By geographical districts, they are: For New England, 85.58; middle Atlantic states, 87.50; south Atlantic states, 91.13; eastern Gulf, 93.82; western Gulf, 92.42; lower lakes, 89.53; upper lakes, 87.43; Ohio valley and Tennessee, 90.72; upper Mississippi valley, 89.50; Missouri valley, 87.87.

There were twenty-six omissions to predict out of 3,720, or 0.70 per cent. Of the 3,694 reductions that have been made, seventy-three, or 1.98 per cent., are considered to have entirely failed; seventy-three, or 1.98 per cent., were one-fourth verified; three hundred and thirty-one, or 8.96 per cent., were one-half verified; three hundred and seventy-two, or 10.07 per cent., were three-fourths verified; 2,845 or 77.01 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During May, 1883, one hundred and thirty-nine cautionary signals were displayed. Of these, one hundred and seventeen, or 84.17 per cent., were justified by winds of twenty five miles or more per hour, at or within one hundred miles of the station. Six cautionary off-shore signals were ordered, of which three, or 50.0 were justified both as to direction and velocity, and the remaining three were justified as to velocity, but not as to direction. Fifteen cautionary signals were changed to off-shore signals. One hundred and forty-five signals, of all kinds, were displayed, of which one hundred and twenty, or 82.76 per cent., were fully justified. These do not include signals ordered at display stations, where the velocity of the wind is only estimated. Eleven signals were ordered late. One hundred and twenty-nine winds of twenty-five miles or over per hour were reported, for which no signals were ordered; many of these were high local winds or strong sea-breezes.

ATMOSPHERIC ELECTRICITY.

AURORAS.

But few auroral displays were reported during the month, none of which were noted for brilliancy or extent of observation.

On the 1st a display was observed at Saint Vincent, Minnesota; Toronto, Ontario; Newport, Vermont; Charlottetown, Prince Edwards' Island; Sydney, Nova Scotia, and on the summit of Mount Washington. At the latter station it was seen from 10.15 p. m. until midnight. It extended over about 40° of the northern horizon, and to an altitude of 20°.

Auroral displays were observed on other dates as follows:

2d.—Eastport, Maine: a faint display was observed at 11.30 p. m.

3d.—Litchfield, Michigan.

4th.—Eastport, Maine: faint straw-colored auroral light observed from 11 p. m. until the morning of the 5th. This display was also reported to have been visible at Oswego, New York, at 2 a. m. of the 5th.

5th.—Lansing, Michigan; Vevay, Indiana.

6th.—Saint Vincent, Minnesota: faint auroral arch observed at 9.40 p. m., extending over about 40° of the northern horizon, and to an altitude of 40°.

8th.—Vevay, Indiana.

9th.—Fort Assinniboine, Montana.

13th.—Eastport, Maine: a faint auroral light was visible from 9 p. m. until the morning of the 14th. This display was also seen at Gardiner, Maine, and Toronto, Ontario.

16th.—Sussex, Wisconsin: An aurora was observed from 8.30 to 8.45 p. m.

19th.—Woodstock, Maryland: An aurora was observed at

9.45 p. m. Although the moon was full, the display was very distinct.

The following report is taken from "Nature" of June 7, 1883:

"On May 19th, at about 10 p. m., a remarkable aurora-borealis was observed at Ludvika, in Sweden. It began as a faint band of light parallel with the horizon, which gradually grew broader and broader. The extraordinary feature of the phenomenon was, however, that this band had the appearance of an ice-covered lake on which the moon was shining. Promontories and shores covered with trees were seen, and also the faint outlines of farms. This phenomenon lasted about ten minutes, when the aurora changed into a suffused pink luminosity, like that of clouds near the setting sun."

20th.—Escanaba, Michigan: straw colored auroral beams were observed in the northern sky after 10 p. m. This display was also observed at Billings, Montana; Humboldt, Iowa; and at the following stations in Minnesota: Moorhead, Northfield, Saint Paul, and Saint Vincent.

21st.—Traverse City, Michigan.

25th.—Ithaca, New York; Sutton, Nebraska.

26th.—Sutton and Red Willow, Nebraska.

27th.—New Haven, Connecticut: a faint aurora was observed in the northern sky from 8 to 11 p. m.

THUNDER-STORMS.

Thunder-storms were reported in the various districts on the following dates:

New England.—8th, 10th, 11th, 14th, 15th, 21st, 22d, 23d, 28th, 29th, 31st.

Middle Atlantic states.—4th, 5th, 7th to 11th, 14th, 15th, 20th, 21st, 22d, 26th to 29th, 31st.

South Atlantic states.—1st, 5th, 9th, 11th, 12th, 14th, 15th, 20th, 21st, 27th, 31st.

Florida peninsula.—1st, 6th, 7th, 13th, 15th, 18th, 29th, 30th, 31st.

Eastern Gulf.—1st, 4th, 9th, 10th, 11th, 14th, 15th, 20th, 26th, 29th, 30th, 31st.

Western Gulf.—3d, 4th, 9th, 10th, 12th, 14th, 17th to 20th, 25th, 26th, 28th, 29th, 30th.

Rio Grande valley.—3d, 4th, 10th, 16th, 17th, 25th, 30th.

Ohio valley and Tennessee.—1st, 3d, 4th, 5th, 7th, 9th, 10th, 11th, 14th, 15th, 17th to 21st, 25th to 31st.

Lower lakes.—1st, 3d, 4th, 5th, 7th, 8th, 10th, 14th, 19th to 22d, 24th to 28th.

Upper lakes.—2d, 3d, 4th, 6th, 7th, 9th, 10th, 13th, 14th, 15th, 18th, 19th, 24th, 25th, 27th, 28th, 30th.

Extreme northwest.—16th, 17th, 24th, 26th, 29th.

Upper Mississippi valley.—1st to 4th, 6th to 10th, 13th to 20th, 23d to 30th.

Missouri valley.—1st, 2d, 3d, 6th to 13th, 16th, 17th, 18th, 23d to 31st.

Northern slope.—1st, 7th, 8th, 11th, 12th, 13th, 15th, 16th, 17th, 21st to 25th, 27th, 28th, 31st.

Middle slope.—1st, 6th, 8th, 12th, 13th, 16th to 19th, 22d to 25th, 28th, 31st.

Southern slope.—4th, 6th, 9th, 11th, 16th, 18th, 19th.

Southern plateau.—12th, 13th, 16th, 31st.

Middle plateau.—7th, 10th, 11th, 12th, 24th, 31st.

Northern plateau.—6th to 13th, 20th, 21st, 24th.

Thunder-storms were also reported from the following states not included in the districts named above:

California.—Benecia Barracks, 6th; Fort Bidwell, 7th; Sacramento, 6th; San Francisco, 11th; Red Bluff, 13th; Visalia, 6th, 10th.

Oregon.—Portland, 10th; Roseburg, 11th.

The following are the most noteworthy instances of damage by lightning that have occurred during May:

On the morning of the 3d, the barge "C. F. Allen," while lying at Muskegon, Michigan, was struck by lightning and burned nearly to the water's edge. The lightning struck the foretopmast and passed down the wire rigging into the hold, setting fire to her cargo of lumber. The barge and cargo are a complete loss. The damage is estimated at $7.000.

Omaha, Nebraska, 8th.—During a heavy thunder-storm on the morning of this date, the telephone office and several other buildings in this city were badly damaged by lightning.

Cedar Rapids, Linn county, Iowa, 9th.—The Union depot was struck by lightning a 3 p. m. of this date, and was partially destroyed.

Lebanon, Saint Clair county, Illinois, 14th.—About four miles north of this place, a barn in which were stored grain, hay, and farming implements, was struck by lightning and consumed.

Jersey City, New Jersey, 10th.—At 3.30 a. m., of this date, an oil tank in the National Storage company's works, at Communipaw, was struck by lightning. A terrific explosion followed, which was heard for miles around. The fire spread rapidly and was not under control for several hours. During the afternoon and early evening, about one and one-half miles of water were covered by the burning oil. The flames consumed everything on seven acres of ground. This conflagration resulted in the loss of eight lives, and the destruction of the following property: twelve oil tanks, each containing 20,000 barrels of crude oil; two large storage houses, containing 1,500 barrels of oil; eighteen cars; three docks; six unloaded barges; three small brick buildings; and the engine room, office, and machine shops. The total loss is estimated at $1,500,000.

New York City, 9th.—A sash and blind factory in this city was struck by lightning on this date, causing damage to the stock and building, estimated at $19,000.

Jamaica, Long Island, 14th.—During a violent thunder-storm which passed over this place between 10 and 11 p. m., the lightning caused much damage at various points on Long Island. At Springfield, a residence was damaged to the extent of $15,000, and all of the inmates were severely injured. At Foster's Meadow, a barn containing hay, grain, farming implements, horses, and cattle was destroyed. Other damage was done at Washington Square and South Woodhaven.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos have been observed in the various districts on the following dates:

New England.—1st, 6th, 8th, 12th, 13th, 14th, 16th, 18th, 19th, 30th.

Middle Atlantic states.—1st, 2d, 3d, 5th, 7th, 8th, 11th, 13th, 14th, 15th, 17th, 18th, 19th, 25th, 28th, 29th.

South Atlantic states.—5th, 11th, 12th, 13th, 18th, 19th, 25th.

Eastern Gulf.—3d, 4th, 12th, 16th, 19th, 20th, 24th, 25th, 27th.

Western Gulf.—1st to 4th, 9th, 13th, 15th to 19th, 22d, 24th to 28th.

Ohio valley and Tennessee.—3d, 4th; 6th, 10th, 12th, 13th, 14th, 16th, 17th, 19th, 24th, 25th, 28th, 29th.

Lower lakes.—1st, 3d, 4th, 8th, 9th, 13th, 14th, 15th, 17th, 18th, 19th, 25th to 28th.

Upper lakes.—1st, 3d, 6th to 9th, 11th, 13th, 15th, 17th, 24th, 25th, 26th.

Extreme northwest.—1st, 2d, 5th, 14th to 17th, 23d.

Upper Mississippi valley.—1st, 3d, 7th, 10th, 12th, 13th, 16th, 18th, 22d to 25th, 27th, 28th.

Missouri valley.—3d, 5th, 6th, 7th, 15th, 17th, 20th, 23d to 28th, 31st.

Southern plateau.—2d, 3d, 11th.

Middle plateau.—4th, 9th, 10th, 14th, 16th, 21st, 23d.

Northern plateau.—4th, 9th, 14th, 20th, 22d, 24th to 27th, 31st.

North Pacific.—10th, 20th, 21st, 22d, 31st.

Middle Pacific.—2d to 7th, 9th, 10th, 11th, 13th, 14th, 17th, 21st, 22d, 26th, 27th, 28th, 31st.

Solar halos were also observed at the following stations not included in the district named above:

Pike's Peak, Colorado, 10th; West Las Animas, Colorado, 10th; Punta Rassa, Florida, 24th; Terry's Landing, Montana, 17th; North Platte, Nebraska, 5th; Red Willow, Nebraska, 3d, 5th, 7th; Eagle Pass, Texas, 24th.

LUNAR HALOS.

Lunar halos have been observed in the various districts on the following dates:

New England.—11th, 15th, 17th, 18th, 19th.

Middle Atlantic states.—1st, 11th, 13th, 14th, 17th to 21st, 25th, 29th, 30th.

South Atlantic states.—11th, 13th, 16th, 17th, 19th, 20th.

Florida peninsula.—10th, 13th, 14th, 17th, 19th, 20th, 22d, 24th, 27th.

Eastern Gulf.—12th, 14th, 16th, 19th, 25th.

Western Gulf.—10th to 16th, 18th, 21st to 24th.

Ohio valley and Tennessee.—4th, 9th, 14th, 16th to 20th, 24th, 25th.

Lower lakes.—13th, 15th, 17th, 18th, 19th, 28th.

Upper lakes.—2d, 13th, 14th, 17th, 18th, 21st, 23d.

Upper Mississippi valley.—12th, 14th, 15th, 16th, 18th, 22d, 24th, 29th.

Missouri valley.—11th, 15th, 16th, 23d, 24th.

Northern slope.—14th to 17th, 20th, 22d.

Middle plateau.—15th, 16th, 18th, 21st.

Lunar halos were also observed at the following stations not included in the districts named above: Tuscón, Arizona, 22d; Yuma, Arizona, 15th; Sacramento, California, 11th; San Francisco, California, 13th; Visalia, California, 10th; Fort Stevenson, Dakota, 13th, 14th; Saint Vincent, Minnesota, 13th, 14th, 19th; Santa Fé, New Mexico, 22d; Eagle Pass, Texas, 13th, 15th, 21st; Uvalde, Texas, 15th; Spokane Falls, Washington Territory, 21st.

MIRAGE.

New Haven, Connecticut, 3d.—During the afternoon mirage was observed on Long Island sound, objects appearing elevated and inverted. Faulkner's Island light-house appeared to be resting on the surface of the water, while the base of the island seemed to be floating in the air at an elevation of one hundred feet.

Cape May, New Jersey, 8th.—Mirage was observed from 3 to 4 p. m. Vessels with inverted images appeared at elevations of from fifty to seventy-five feet and were distinctly seen at a distance of ten miles. The Brandywine light-house, eight miles distant, appeared as three structures, one above the other, the second being inverted and the top one apparently one hundred and fifty feet high.

Buffalo, New York, 10th.—At 6.15 p. m. the trees on the Canadian side of the river appeared several degrees above the horizon.

Alexandria, Dakota, 6th, 21st.
Pretty Prairie, Kansas, 4th, 7th.
Indianola, Texas, 6th, 11th, 12th.

MISCELLANEOUS PHENOMENA.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal-Service stations. Reports from one-hundred and seventy-two stations show 5,306 observations to have been made, of which eight were reported doubtful; of the remainder, 5,298, there were 4,503 or 85.0 per cent., followed by the expected weather.

METEORS.

Johnson, Nemaha county, Nebraska.—At 8.30 p. m. of the 5th, a bright meteor was observed about 15° south of the zenith. It passed nearly due north and disappeared at a point about 30° north of the zenith. The meteor was apparently about the size of a man's head, with a bright yellow nucleus surrounded by a reddish tinge.

Little Rock, Arkansas.—A brilliant meteor of violet color was observed here at 8.15 p. m. of the 14th. It first appeared at a point near the zenith, and moved in a northwesterly direction. Before disappearing the meteor separated into two parts, both of which remained visible for about one second.

Nashville, Tennessee.—At 11.16 p. m. of the 16th, a bright meteor of deep blue color was observed to pass from the zenith toward the southeastern horizon. Another brilliant meteor was seen at this station at 9.45 p. m. of the 26th.

Meteors of less brilliancy were seen at the following stations:
Bethel, Connecticut, 11th.
Ames, Iowa, 12th.
Cedar Rapids, Iowa, 31st.
Woodstock, Maryland, 6th, 25th, 31st.
Rowe, Massachusetts, 25th.
Lansing, Michigan, 2d, 3d.
Visalia, California, 2d, 17th, 23d, 26th, 27th, 28th, 31st.

SUN SPOTS.

The following record of sun spots for the month of May, 1883, has been forwarded by Mr. D. P. Todd, Director of the Lawrence Observatory, Amherst, Massachusetts:—

Date—May, 1883.	No. of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 7 a. m.	0	2	0	0	0	0	3	10	
2, 10 a. m.	0	0	0	0	0	0	3	7	
2, 5 p. m.	0	0	0	0	0	0	3	7	
3, 5 p. m.	2	3	0	0	1	1	5	10	
6, 2 p. m.	0	3	.....	.....	.....	.....	2	7	
7, 9 a. m.	0	2	0	0	0	0	2	9	
8, 9 a. m.	0	0	0	0	0	0	2	9	Spots probably reappeared by solar rotation.
10, 5 p. m.	2	5	0	0	2	5	4	14	
11, 5 p. m.	0	2	0	4	0	0	4	12	
12, 10 a. m.	0	1	0	2	0	0	4	9	
13, 11 a. m.	0	0	1	2	0	0	3	7	
14, 10 a. m.	1	5	0	0	0	0	4	12	
16, 10 a. m.	0	0	1	2	0	0	3	10	Spots probably disappeared by solar rotation.
17, 10 a. m.	1	2	0	0	0	0	4	11	
18, 10 a. m.	0	0	0	0	0	0	4	11	
19, 4 p. m.	1	3	0	2	0	0	5	12	
24, 7 a. m.	1	2	.....	.....	1	2	1	2	Spots probably reappeared by solar rotation.
25, 10 a. m.	0	0	0	0	0	0	0	0	
26, 11 a. m.	0	0	0	0	0	0	0	0	
27, 2 p. m.	0	0	0	0	0	0	0	0	No faculæ.
28, 11 a. m.	0	0	0	0	0	0	0	0	do.
29, 4 p. m.	1	1	0	0	0	0	1	1	
30, 10 a. m.	0	0	0	0	0	0	1	1	
31, 10 a. m.	1	3	0	0	1	2	2	4	

Faculæ were seen at the time of every observation, unless otherwise indicated.

EARTHQUAKES.

Helena, Montana, 4th.—A slight shock of earthquake occurred at this place at about 11.45 a. m., the wave moving from east to west. It affected the public school building, producing a rocking motion, and causing some alarm among the pupils. Houses in several parts of the city experienced the shock.

Catlettsburg, Boyd county, Kentucky.—Two distinct shocks of earthquake were felt at this place at 11.30 p. m. of the 22d.

The following extract is taken from "Nature" of May 10th, 1883: "A strong earthquake shock, with an undulating motion, was felt at Biancaville, Sicily, on the morning of the 8th."

Victoria, British Columbia.—A severe shock of earthquake was felt at this place during the night of the 10th. The movement was from north to south.

The barge "Inga," Captain Olsen, commanding, which arrived at New York June 1st, from Padang, Sumatra, reported that on February 14th, 1883, while eighty-four miles north-northwest of the island of Engano, an earthquake shock was felt. The vessel trembled, and the sea became a white foam, like the breaking of a school of fish. There was no wind at the time.

SAND-STORMS.

Fort Garland, Colorado, 29th.
Fort Union, New Mexico, 6th.
Yuma, Arizona, 6th, 12th, 13th, 14th, 16th.
San Carlos, Arizona, 12th.

POLAR BANDS.

West Washington, District of Columbia, 17th.
Guttenburg, Iowa, 22d.
Yates Centre, Kansas, 22d, 25th, 27th.
Gardiner, Maine, 13th, 14th.
Somerset, Massachusetts, 26th.

Clear Creek, Nebraska, 25th.
Vineland, New Jersey, 25th.
Wytheville, Virginia, 17th, 19th, 20th.
Charleston, South Carolina, 25th.
Punta Rassa, Florida, 24th.
Memphis, Tennessee, 24th.
Los Angeles, California, 5th.
Cape Mendocino, California, 4th, 20th, 24th, 31st.
Woodstock, Vermont, 1st, 11th.

ZODIACAL LIGHT.

Cambridge, Massachusetts, 2d, 3d, 6th, 8th, 27th, 29th.
Northport, Michigan, 15th.
Wauseon, Ohio, 5th, 7th, 12th, 26th.
Cape Lookout, North Carolina, 3d.
Punta Rassa, Florida, 2d, 3d, 4th.
Pensacola, Florida, 23d.
Vicksburg, Mississippi, 29th.
Palestine, Texas, 2d, 5th, 6th, 23d.
Little Rock, Arkansas, 6th.
Nashville, Tennessee, 1st, 2d, 3d, 5th, 7th, 8th, 24th to 28th.
Prescott, Arizona, 1st to 8th, 24th to 31st.

PRAIRIE AND FOREST FIRES.

Marshfield, Plymouth county, Massachusetts, 1st.—A disastrous fire occurred on the Marshfield plains. It is estimated that three thousand acres of woodland were burned over.

Concord, New Hampshire, 18th.—A disastrous fire occurred in "dark plains", east of this city, at noon. The flames swept over about five hundred acres of land, a large part of which was covered by a heavy growth of valuable timber, and about five hundred cords of wood. The damage is estimated at $5,000.

Woodville, Grafton county, New Hampshire, 18th.—Forest fires have burned over 1,000 acres of land in this vicinity. In Hall's woods, seven miles from this place, the fires burned over an area of 2,000 acres and destroyed 4,000 cords of wood. At Barnstable a large tract of woodland was burned over, and much cord-wood was destroyed. The fires also raged on Blue Terry mountains and on Mount Webster.

Lancaster, Coos county, New Hampshire.—A fire originated in the woods on Cherry mountain during the 19th, and spread over a large area, destroying timber valued at $10,000. A saw mill together with a large quantity of logs, lumber, and cord-wood were also burned.

Montpelier, Vermont.—The most disastrous forest fire that ever occurred in this state, originated in the vicinity of Groton, Caledonia county, on the 19th. An extensive area was burned over and a large amount of property destroyed. The loss is estimated at $150,000.

Less extensive prairie and forest fires occurred as follows:
Alexandria, Dakota, 10th, 21st.
Yankton, Dakota, 7th, 16th, 22d, 24th, 28th, 30th.
Fort Stevenson, Dakota, 3d, 15th.
Milton, Massachusetts, 13th.
Somerset, Massachusetts, 18th, 19th.
Williamstown, Massachusetts, 1st.
Indianola, Texas, 13th, 21st, 22d, 27th.
Saint Vincent, Minnesota, 16th.
Fort Bayard, New Mexico, 6th, 26th, 27th, 28th.
Mount Washington, New Hampshire, fires in northwest, 18th, 19th.
North Platte, Nebraska, 9th.
Moorhead, Minnesota, 16th.

MIGRATION OF BIRDS.

Geese flying northward.—Alexandria, Dakota, 1st; Bismarck, Dakota, 6th; Clear Creek, Nebraska, 20th; Albany, Oregon, 8th; Grand Haven, Michigan, 3d, 5th; Roseburg, Oregon, 3d. *Flying southward.*—Yuma, Arizona, 29th. *Flying west.*—Yuma, Arizona, 23d.

Ducks flying northward.—Clear Creek, Nebraska, 20th.

NOTES AND EXTRACTS.

The following summary is taken from the May report of the "Illinois Meteorological Service."

Summary of meteorological observations for the month of May, 1883, made to the Illinois Department of Agriculture, Springfield, June 1, 1883. Hours for taking observations: 7 a. m., 2 p. m., 9 p. m.

Stations.		Elevation above sea—feet.	Thermometer.						Barometer.						Wind.		Rain.		No. of days on which cloudiness averaged 0.8 or more.	Mean humidity.
County.	Post office.		Highest.	Lowest.	Mean.	Range of.	Highest daily mean.	Lowest daily mean.	Highest.	Lowest.	Mean.	Range of.	Highest daily mean.	Lowest daily mean.	Prevailing direction.	Max. velocity or force in miles per hour.	No. of days on which rain or snow fell.	Total rainfall.		
Northern div'n.			°	°	°	°	°	°												
Cook	Chicago	657	80.10	35.90	52.10	44.20	70.40	38.10	30.290	29.484	29.924	0.806	30.177	29.573	n.	5	18	7.32	.....	69.3
Kane	Aurora	676	85.00	34.00	36.10	51.00	72.66	39.33	30.260	29.470	29.890	0.790	30.160	29.560	se.	5	18	7.23	13	77.0
McHenry	Marengo	925	81.00	30.00	52.40	51.00	72.00	37.00	.....	.....	.....	.....	.....	.....	sw.	7	15	6.18	14	.....
Ogle	Polo	.....	81.00	29.00	52.45	52.00	70.00	38.00	.....	.....	.....	.....	.....	.....	w.	.....	16	6.14	14	.....
Peoria	Peoria	460	87.00	35.00	60.70	52.00	.....	.....	29.894	29.098	29.543	0.796	.....	.....	s.	5	15	6.54	6	68.0
Warren	Monmouth	700	86.00	34.00	59.76	52.00	73.00	48.00	29.700	28.890	29.377	0.810	.....	.....	nw.	4	14	5.32	13	.....
Whiteside	Morrison	970	82.00	33.00	55.82	50.00	.....	.....	.....	.....	.....	.....	.....	.....	sw.	6	13	4.76	10	.....
Stark	Elmira	.....	83.00	30.00	54.98	47.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11	4.31	.....	.....
De Kalb	Sycamore	800	80.20	34.00	53.13	46.20	74.30	38.00	.....	.....	.....	.....	.....	.....	nw.	6	15	8.55	18	.....
Lee	Prairieville	725	80.00	36.00	57.80	44.00	75.10	45.20	30.150	29.360	29.810	0.790	30.081	29.440	s.	5	13	7.01	10	74.5
Central division.																				
Christian	Pana	760	85.00	40.00	62.50	45.00	70.50	48.00	.....	.....	.....	.....	.....	.....	nw., sw.	5	8	4.31	20	.....
Coles	Mattoon	724	86.00	32.00	61.00	54.00	75.00	49.50	.....	.....	.....	.....	.....	.....	s.	.....	14	4.15	8	.....
Logan	Atlanta	810	88.00	29.00	57.10	59.00	74.00	38.00	.....	.....	.....	.....	.....	.....	sw.	.....	14	5.59	7	.....
Pike	Griggsville	625	88.00	31.00	58.00	57.00	75.00	38.00	30.45	29.630	30.010	0.820	30.340	29.700	sw., nw.	5	13	6.60	12	.....
Sangamon	Springfield	640	87.00	33.90	60.10	53.10	72.50	40.80	30.301	29.500	29.936	0.801	30.236	29.606	s.	5	16	6.60	.....	65.2
Southern div'n.																				
Alexander	Cairo	377	83.50	38.00	65.20	45.50	76.80	43.80	30.349	29.677	30.013	0.672	30.286	29.745	sw.	6	12	3.85	.....	66.4
Bond	Greenville	.....	91.00	34.00	63.40	57.00	80.30	42.60	.....	.....	.....	.....	.....	.....	s.	.....	9	6.25	18	63.4
Crawford	Palestine	.....	86.00	38.00	58.51	48.00	76.25	41.25	.....	.....	.....	.....	.....	.....	s.	5	10	2.09	8	.....
Hamilton	McLeansboro'	.....	86.00	35.00	63.00	51.00	76.70	41.20	.....	.....	.....	.....	.....	.....	sw.	6	12	5.20	10	.....
Pope	Golconda	.....	84.00	40.00	68.00	44.00	75.50	41.25	.....	.....	.....	.....	.....	.....	nw.	6	12	7.13	9	.....
Saint Clair	Mascoutah	.....	84.00	31.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.20	.....	.....
Union	Anna	625	85.00	32.00	64.74	53.00	.....	.....	30.250	29.680	30.010	0.570	.....	.....	nw.ne.sw.	4	10	6.64	9	.....

Dr. Gustavus Hinrichs, director of the "Iowa Weather Service," has forwarded the following advance proof of his report for May, 1883:

May, 1883, was remarkably cold, very rainy, with late frosts, westerly and northerly winds prevailing.

The mean temperature of the air was nearly five degrees below normal; in forty-five years May has been six times as cold or colder than this year,

namely, in 1882, 1867, 1858, 1851, 1850, and 1849. The late frosts about the 12th and 22d were general.

The rainfall was much above normal throughout Iowa, except in middle northern Iowa and down the middle Cedar and Wapsipinicon valleys. The total rainfall was highest along the Mississippi and Missouri rivers, and from Wayne to Polk county; in the regions here specified the rainfall averaged seven inches.

The rain frequency was also high; two of every three days were rainy in most parts of the state.

The principal storm days were the 8th and 9th, the 13th and 14th, 17th and 27th. On the 9th a very small tornado did slight damage in Linn county, near Norway Station; on the other storm days Iowa was spared the visitation of tornadoes, which struck on the 13th Kansas City; 18th, Racine; 28th, southern Indiana.

While unusally cold and quite wet, the season is much more promising than last year, when May was much colder.

The following summary has been forwarded by Mr. S. R. Thompson, director of the "Nebraska Weather Service:"

The month was colder than usual with much rain.

Rainfall.—The average was by sections as follows: Southeast, 5.79 inches, northeast, 6.72; southwest, 5.98; northwest, 5.01. Average for entire state, 5.88.

Temperature.—The mean temperature of the air was 59°.60. The average of all noon observations was 63°.63.

The following are some of the maximum and minimum temperatures: Omaha, maximum, 87°.2; minimum, 39°.0; North Platte, maximum, 87°.3; minimum, 31°.0; De Soto, maximum, 93°.0; minimum, 39°.0; Agricultural College, maximum, 88°.0; minimum, 35°.0; Peru, maximum, 82°.87; minimum, 43°.25.

Mean relative humidity.—Omaha, 68.4; North Platte, 70.0; De Soto, 73.8; Agricultural College, 72.84.

Wind.—Number of miles travelled: Omaha, 6,626; North Platte, 9,488; mean direction, Omaha, north; North Platte, west. Greatest velocity at Omaha, 36 miles, southwest; at North Platte, 40 miles, east.

Miscellaneous.—Light frost on the 22d, at Inavale, Nebraska City, Table Rock, Genoa, Peru, and Central City.

A hail storm at Red Cloud and vicinity did considerable damage to crops. Corn planting commenced on the 1st at Beaver Creek.

At Red Willow the thermometer fell from 88° to 60° in two hours.

J. H. Hunt, Superior, writes that on the 26th they had a hail storm lasting ten minutes. Hail fell as large as hickory-nuts and covered the ground two inches deep, giving the appearance of midwinter. Trees were almost denuded of leaves, and fruit and crops were destroyed. The hail had not yet all melted at 9 a. m. on the 27th. Observers report that corn has been planted earlier than usual and that much had to be replanted.

To observers.—Although as a rule the reports come in good time, some are invariably behind-hand. All reports should be here by the 6th, as the report is not available at Washington for the monthly bulletin, unless it reaches there before the 12th of the month. Hoping that you will consider the necessity of having the report out early.

I am yours, respectfully, S. R. THOMPSON, Director.

Professor Mendenhall, of the "Ohio Weather Service," furnishes the following meteorological summary for May, 1883:

Report of the Ohio meteorological bureau. *Summary for the month of May, 1883.*

Numbers.	Stations.	Counties.	Mean barometer.	Highest barometer.	Day of month.	Lowest barometer.	Day of month.	Range of barometer.	Mean relative humidity.	Mean temperature.	Highest temperature.	Day of month.	Lowest temperature.	Day of month.	Range of temperature.	Mean daily range of temperature.	Greatest daily range of temperature.	Day of month.	Least daily range of temperature	Day of month.	Number of clear days.	Number of fair days.	Number of cloudy days.	Days on which rain or snow fell.	Total rainfall for month.	Average daily rainfall.	Direction of wind.
											°		°		°	°	°		°								
1	Cincinnati	Hamilton	29.976	30.336	6	29.548	20	.788	63.7	62.6	85.0	9	35.0	22	50.0	17.2	29.0	7	7.0	29	10	12	9	16	5.49	.177	nw.
3	Dayton	Montgomery	29.987	30.381	6	29.521	14	.857	69.0	60.1	84.8	8	32.0	22	52.8	21.3	32.2	9	9.0	22	10	12	9	13	5.09	.164	s.
4A	Lima	Allen	30.006	30.329	5	26.574	14	.755	78.0	58.0	88.0	3	32.0	22	56.0	28.4	47.5	7	7.0	22	10	13	8	12	6.13	.198	sw.
4B	Sidney	Shelby							66.0	58.5	88.0	9	29.5	13	58.5	29.7	44.0	9	11.0	20	5	14	12	13	5.56	.179	w.
5	Up'r Sandusky	Wyandot	29.975	30.360	6	29.609	14	.751	66.0	58.4	83.0	9	33.0	22	50.0	23.6	37.0	4	6.5	22	7	15	9	14	6.58	.212	s.
6	Wauseon	Fulton	29.920	30.260	6	29.540	14	.720	71.0	54.8	83.3	3	27.4	13	55.9	24.1	40.9	24	7.8	22	4	14	13	22	5.97	.193	sw.
7	Lebanon	Warren							74.0	59.8	85.0	4	33.5	21	51.5	22.1	39.1	7	10.0	29	7	13	11	16	7.23	.233	sw.
8	N. Lewisburg	Champaign							68.0	60.5	83.0	9	31.7	22	51.3	21.8	34.0	9	7.0	10	8	13	10	14	6.05	.195	sw.
9A	Levering	Knox							73.0	56.3	81.5	9	33.5	17	48.0	21.7	34.0	9	8.0	28	11	11	9	14	6.10	.197	sw.
9B	Gambier	Knox	29.946	30.309	6	29.481	21	.828	70.0	56.7	81.0	9	35.0	23	46.0	20.6	33.0	9	8.0	22	5	8	15	10	5.20	.168	w.
10	Toledo	Lucas	29.913	30.260	6	29.524	14	.742	64.9	55.8	80.0	19	32.0	21	48.0	18.2	34.0	3	7.0	22	6	11	14	18	5.69	.184	s.
11	Ironton	Lawrence	29.994	30.319	6	29.559	20	.760		62.1	88.0	5	35.0	22	50.0	25.7	39.0	8	8.0	22				7	3.90	.120	se.
12A	Washington	Fayette							69.0	58.8	86.3	9	33.0	22	53.3	25.8	36.9	7	10.0	22	8	12	11	14	6.85	.215	sw.
12B	Waverly	Pike																						10	3.50	.113	w.
13A	Columbus	Franklin	29.941	30.278	6	29.469	21	.809	62.2	59.5	85.0	8	34.0	21	51.0	20.6	31.0	14	7.0	22	7	13	11	16	6.38	.206	sw.
13B	O. S. University	Franklin								61.0	80.0	8	34.0	22	52.0	27.4	43.0	7	9.0	22	7	16	8	14	5.76	.186	sw.
13C	Westerville	Franklin	29.960	30.326	6	29.530	21	.796	78.0	56.4	85.0	9	33.0	22	52.0	25.9	43.0	7	9.5	22	7	13	11	10	5.13	.165	sw.
14	Oberlin	Lorain	29.989	30.324	6	29.612	21	.712	77.0	54.8	85.1	3	31.5	1	53.6	24.7	40.0	17	1.0	22	6	14	11	16	6.55	.211	sw.
15	Marietta	Washington	29.945	30.325	6	29.390	21	.935	73.0	61.0	89.0	4	36.9	17	52.1	24.8	35.8	3	9.9	22	8	10	13	13	5.44	.175	sw.
16	Granville	Licking							70.0	58.1	84.7	9	32.7	22	52.0	22.0	34.1	14	9.9	29	11	13	7	9	4.47	.144	sw.
17	Quaker City	Guernsey							73.0	59.3	85.5	4	35.0	23	50.5	24.1	35.0	14	14.5	20	10	12	9	13	5.23	.169	s.
18	Canton	Stark	29.964	30.321	17	29.491	21	.830	70.0	56.7	83.2	4	30.0	17	53.2	23.0	37.0	17	4.4	22	7	13	12	16	5.74	.185	sw.
19	Warren	Trumbull							72.0	56.6	83.8	4	30.9	17	52.9	22.3	38.8	4	4.7	21	6	14	11	17	6.33	.204	sw.
20	Wooster	Wayne	30.017	30.329	6	29.567	21	.762	71.0	56.0	83.0	4	32.0	17	51.0	21.9	41.0	3	3.0	22	8	12	11	9	5.39	.194	s.
21A	Cleveland	Cuyahoga	29.929	30.280	6	29.467	14	.813	64.8	54.2	80.0	3	34.3	17	46.5	18.7	36.9	3	3.0	22	8	12	11	20	6.50	.210	nw.
21B	Cleveland	Cuyahoga								54.7														18	6.81	.220	nw.
	State		29.964	30.381	6	29.390	21	.991	70.4	58.0	90.0	4	27.4	13	61.6	23.2	47.5	7	1.0	22	7.7	12.7	10.6	14.1	5.72	.184	sw.

NOTE.—The means are computed only from station reports covering the entire month, and whose instruments have been compared with standards.

The "Missouri Weather Service," under direction of Professor Francis E. Nipher, has issued the following report:

The average temperature for May at the central station has been 63°.4, which is 2°.8 below the normal temperature and 3°.5 above the temperature of May, 1882. Since 1837 the May temperature has fallen below that of last month five times. The extremes during last month at the central station were 38°.0 and 88°.4, although in the suburbs of Saint Louis the temperature fell to 36°.0 on the evening of the 21st. In 1851 Dr. Englemann observed a temperature of 29°.0 in May, but it was in the early part of the month.

In the state the lowest minimum temperatures reported were: 29°.5 at Centreville; 31°.0 at Big Creek, Warren county; 32.0 at Steelville; all other stations reporting over 34°.0. The highest minimum temperatures are reported from Glasgow, 45°.0 and Harrisonville, 47°.0. The highest maximum temperatures reported were: Corring, 91°.0; Miami, 98°.0; Harrisonville and Big Creek, 90°.0. The highest average temperature reported were: Cairo, Ills., 65°.2; Mascoutah, Ills., 65°.0; Harrisonville, 64°.0; the lowest being, at Keokuk, Ia., 59°.9; Macon, 60°.4; Louisiana, 60°.5.

The rainfall at the central station was 2.61, which is 2.2 inches below the normal May rainfall at Saint Louis. In western Missouri, however, from Harrisonville northward along the Missouri valley, the rainfall has been over seven inches, and a small maximum of over seven inches occurs in the region around Ironton. An area of minimum rainfall of between two and three inches occurs in southwest Missouri, around Greenfield and Lamar, and another occurs along the lower Missouri below Chamois, extending along the Mississippi as far south as Cairo.

On the 13th, tornadoes occurred at various points in Missouri and Kansas, as follows: The town of Oronogo, Jasper county, was destroyed at about 7.40 p. m., two persons being killed and forty injured. This tornado is probably the one which passed about two miles north of Carthage. Hailstones as large as hens' eggs fell at Springfield at about 10 p. m.

Another storm passed two miles southeast of Pattonsville, Davies county, on the same evening.

Two tornadoes passed through Kansas City at 5 o'clock, one passing a few minutes later than the other. Several persons were killed and a great deal of damage was done to property. These whirls were slender, whip-like vortices, the diameter at the surface of the earth being only a few feet, although the destructive path was about seventy feet. These storms originated apparently in Wyandotte county, Kansas, where they caused great damage. A later development of this storm passed through Macon City, one hundred and twenty miles east-northeast from Kansas City, where a tornado occurred about 8.30 p. m. The track was from one-fourth to three-eighths of a mile wide. Three persons were killed at Macon.

On the 18th, tornadoes occurred in Missouri, Illinois, and Wisconsin as follows: at 7 p. m. a tornado did considerable damage at Berger, Gasconade county, Missouri.

At about 8.20 p. m. a tornado passed through Wentzville from the south

west, causing great destruction of property and loss of life as far as Saint Paul, Missouri.

At about the same time a storm passed from Cottleville, through Elm Point, to Grafton, on the Illinois shore of the Mississippi river.

In Illinois tornadoes occurred as follows: At Edwardsville a destructive tornado occurred about 11 o'clock p. m. This tornado passed over Saint Louis shortly after 10 o'clock, manifesting itself as a severe puff of wind.

A tornado passed four miles southeast of Staunton, Macoupin county, at 9 o'clock p. m. Its track was seven miles long and two hundred yards wide.

At Shipman, Macoupin county, between 8 and 9 o'clock p. m., a tornado did great damage, and a parallel track was traversed by another in the same county, passing through Plainview at 9 o'clock.

At 6 o'clock p. m. a tornado struck the earth two miles east of Whitehall, Greene county, sweeping south of Murryville into Morgan county.

At 8 o'clock p. m. a tornado destroyed Literberry, Morgan county.

About 9.40 p. m. a tornado passed near Hillsboro', Montgomery county, causing great destruction. This tornado reached Nokomis after 10 o'clock, passing about four miles north of Pana, Shelby county. This was probably the same whirl which visited Pesotum, Champaign county, at 11.30 p. m., where the whirl was clearly defined and great damage done. It is said that four inches of rain fell here. Mount Pulaski, Logan county, was visited by a tornado on the same evening, the track passing near Kenny through the southern part of De Witt county.

A destructive tornado also passed near Rockford, Winnebago county, but the hour of occurrence is not given. This may have been the same tornado which passed through Racine, Wisconsin, at 7 o'clock, causing great damage and killing nine or ten persons.

In Illinois about sixty lives were lost in these tornadoes.

Hail-storms have occurred as follows: At Big Creek, 10th; Centreville, 9th; eight miles north of Savanah, 3d; Hannibal, 9th; Louisiana, 9th and 10th; and at Springfield and Dover church, near Louisiana, large hail fell on the afternoon of the 18th; Lamar, 3d; Chamois, 9th—a violent storm of wind and hail at 7 p. m. for seven or ten minutes, the hail completely covering the ground, some stones weighing six ounces—on the 18th, at 5.50 p. m., a dark cloud in the southwest moved to the west with a heavy roaring noise, appearing to spend its force when due west, rain and small hail following.

Killing frosts occurred on the nights of the 21st and 22d as follows: At Big Creek, great damage to wheat, corn, and fruit. At Centreville, at 9 p. m., on the 21st the temperature was 32° and fell later to 29°.5—the latest frost in sixteen years. Fog prevented damage in the valleys of the Black river, but in the dry valleys everything was killed. Louisiana, 32° at sunrise on the 22d. Chamois, destructive frost with ice an eight of an inch thick in a pan of water. Greenfield, heavy frost which injured foliage of forest trees so that they looked as though scorched by fire.

White frosts occurred as follows: Hannibal, Greenfield, Mexico, Chamois, 5th; Hannibal, Louisiana, Chamois, Miami, 11th; Ironton, 16th; over the entire state, 21st and 22d, but light in the southwest, where the temperature was about 40°; Mexico, Ironton (33° at 5.30 a. m.), Louisiana, Chamois, Miama, Greenfield, 23d; Sedalia, Centreville, Greenfield (heavy), Ironton, Chamois, Miami, 31st.

The following meteorological summary and table are taken from the May report of the "Tennessee Weather Service":

Mean temperature, 64.5.
Highest temperature, 92°, on the 8th at Murfreesboro'.
Lowest temperature, 33°, on the 22d at Grand View.
Range of temperature 59°.
Mean daily range of temperature, 19°.66.
Greatest daily range of temperature, 40° on the 7th at Andersonville and Florence Station.
Least daily range of temperature 1°, on the 27th at Fostoria.
Mean depth of rain or melted snow, 3.87 inches.
Greatest depth of rain or melted snow, 11.9 inches at White Bluff.
Least depth of rain or melted snow, .81 inches at McMinnville.
Average number of clear days, 12.
Average number of fair days, 7.
Average number of cloudy days, 12.
Average number of days on which rain or snow fell, 7.
Prevailing direction of the wind, Southwest.

Abstract of meteorological observations for the month of May, 1883, as reported to the Bureau of Agriculture, &c., of Tennessee, by voluntary observers in co-operation with General W. B. Hazen, Chief Signal Officer, U. S. A.

County.	Station.	Latitude north.	Longitude west of Washington.	Temperature.								Wind.			Number of days—											Total rainfall, including hail, snow, and sleet (in inches).	Observers.
				Mean of 7 a. m.	Mean of 2 p. m.	Mean of 9 p. m.	Average monthly.	Highest.	Date.	Lowest.	Date.	Prevailing direction.	Greatest force. Scale 0 10.	Date.	Clear.	Fair.	Cloudy.	Aurora.	Dew.	Fog.	Frost.	Lunar halos.	Solar halos.	Hail-storms.	Thunder-storms.	On which rain fell, including hail, snow, and sleet.		
		° ′	° ′	°	°	°	°	°		°																		
Anderson	Andersonville	36 20	9 58	53	81	65	66	86	8	38	22	ne.	h.	14	16	3	12	.....	.....	3	1	2	1	.....	1	8	1.19	J. K. P. Wallace.
Bedford	Flat Creek	35 30	9 40	58	71	64	64	82	18	41	22	sw.	h.	14	7	15	9	.....	.....	.....	1	.....	2	1	5	9	3.79	William Hart.
Blount	Maryville	35 45	7 00	57	75	63	65	86	14	40	22	w.	h.	15	11	8	12	.....	.....	1	1	.....	.....	1	1	8	3.43	W. H. Henry.
Bradley	Grief	35 11	7 42	50	76	61	63	86	9	43	24	n.	br.	15	6	11	14	.....	.....	1	1	.....	.....	1	1	6	2.22	J. T. Cowden.
Campbell	Caryville	35 00	7 30	55	72	61	61	84	9	40	22	w.	h.	26	11	4	16	.....	... ..	4	1	1	.....	.....	.....	6	2.27	Fletcher Smith.
Carroll	Huntingdon	36 00	11 20	62	72	61	65	84	9	44	21	sw.	h. 4.	9	11	8	12	.....	24	1	1	.....	1	.....	3	7	4.20	A. W. Hawkins.
Carroll	Huntingdon	36 05	11 23	57	76	65	66	85	26	39	23	sw.	h.	28	14	2	15	.....	.....	7	2	.....	.....	.....	1	3	3.80	J. S. Ramsey.
Carroll	McKenzie	36 10	11 30	63	79	65	69	88	19	41	23	s.	br.	28	14	9	8	.....	.....	.....	2	1	.....	.....	1	7	6.10	John Brown.
Cheatham	Kingston Springs	36 10	10 04	56	.....	68	63	78	18	39	22	nw.	br.	21	11	9	11	.....	.....	3	2	1	.....	.....	.....	4	4.57	W. J. Inman.
Coffee	Manchester	35 20	9 04	61	73	59	64	84	9	41	22	sw.	br.	15	8	10	13	.....	.....	2	1	.....	.....	.....	.....	8	3.05	Wiley Hickerson.
Coffee	Beech Grove	35 30	9 06	57	74	66	66	86	18	37	22	sw.	.....	.....	16	4	11	.....	.....	.....	1	1	.....	.....	.....	9	3.70	B. F. Cheatham.
Cumberland	Grassy Cove	36 00	8 00	54	68	55	59	82	4	38	22	s.	br.	18	21	3	6	.....	.....	1	.....	1	.....	.....	1	10	3.62	Nettie M. Stratton.
Crockett	Gadsden	35 45	12 00	.....	.....	.....	.....	.....	.....	.....	.....	s.	br.	15	8	13	7	.....	.....	.....	2	.....	.....	1	.....	9	5.40	M. T. Moore.
DeKalb	Smithville	35 50	8 40	60	71	66	66	84	18	38	22	sw.	h. 4.	30	7	11	13	.....	.....	.....	.....	.....	.....	.....	2	8	4.05	P. C. Bluhm.
Dickson	White Bluff	36 00	10 00	59	70	59	63	84	10	40	20	.....	.....	.....	16	6	9	.....	.....	.....	.....	.....	.....	.....	.....	5	11.09	Prof. McMillan.
Dyer	Dyersburg	36 15	12 20	59	71	61	64	82	19	42	22	s.	br.	21	16	4	11	.....	.....	.....	2	1	1	.....	.....	9	3.26	L. Hughes.
Gibson	Milan, 440 ft	35 55	11 47	58	70	63	64	87	8	41	22	s.	h. 4.	28	16	5	10	.....	12	.....	1	.....	1	2	7	7	4.79	M. D. L. Jordan.
Gibson	Trenton	35 58	11 58	59	70	63	64	82	3	42	22	sw.	h.	21	8	6	12	.....	.....	.....	2	.....	.....	1	2	9	.....	A.S.Currey, (26 d's).
Giles	Pulaski	35 15	10 00	60	71	64	65	85	8	39	22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	2.51	Prof. W. T. Mann.
Greene	Greeneville	36 42	7 49	59	73	66	66	84	14	41	24	w.	h.	15	16	4	11	.....	.....	4	1	.....	.....	.....	.....	4	1.02	E. Link.
Hawkins	Rogersville	36 22	6 00	58	71	60	63	84	7	38	24	sw.	br.	21	11	9	11	.....	.....	2	1	1	.....	1	1	10	1.98	S. V. McCorkle.
Hardeman	Bolivar	35 18	12 00	58	71	64	64	84	8	44	22	s.	br.	20	18	8	5	.....	.....	.....	1	.....	.....	.....	3	6	4.54	E. P. McNeal.
Hardin	Savannah	35 20	11 40	60	73	65	66	84	8	44	22	sw.	h.	20	17	9	5	.....	.....	.....	1	.....	.....	.....	.....	6	4.78	H. R. Hinkle.
Haywood	Brownsville	35 36	12 20	55	73	62	63	88	9	42	22	sw.	.....	.....	15	4	12	.....	.....	.....	2	.....	1	1	.....	11	5.71	Daniel Bond.
Henry	Paris	36 33	11 25	63	.....	66	64	77	19	40	22	w.	br.	19	17	5	9	.....	.....	.....	2	.....	.....	.....	.....	4	4.34	J. J. Travis.
Humphreys	Waverly	36 00	10 45	56	71	70	65	81	9	37	23	sw.	.....	.....	12	8	11	.....	.....	1	2	.....	.....	.....	.....	6	5.04	D. B. Owen.
Knox	Knoxville	.....	.....	57	70	52	59	86	9	37	22	sw.	.....	.....	5	10	16	.....	.....	.....	.....	.....	.....	2	.....	10	2.74	Prof. J. W. Glenn.
Lewis	Hohenwald	35 30	10 30	.....	.....	.....	.....	.....	.....	.....	.....	sw.	br.	18	19	5	7	.....	.....	.....	1	.....	.....	.....	1	5	5.59	A. P. Grover.
Lincoln	Howell	35 15	9 30	60	74	62	65	86	8	41	22	s.	br.	22	6	7	18	.....	.....	4	1	1	2	.....	.....	5	3.01	O. R. Hatcher.
Marion	Fostoria, 1,200 ft	35 10	8 50	50	70	57	59	80	9	35	24	n.	br.	20	21	.....	10	.....	.....	.....	1	.....	.....	1	2	.....	.....	Charles Foster.
Maury	Hardison's Mills	36 00	10 00	63	75	64	67	86	19	39	22	n.	.....	.....	6	14	11	.....	...	3	1	4	7	.....	2	7	3.14	Calvin Hardison.
McMinn	Chuckaluck	35 30	7 30	50	73	59	61	84	9	34	24	n.	br.	27	19	5	7	.....	.....	.....	1	1	1	1	1	5	2.48	Jacob Zeigler.
McNairy	McNairy Station	35 00	12 00	66	74	65	68	86	9	41	22	nw.	br.	21	20	5	6	.....	.....	2	.....	.....	.....	.....	.....	6	4.05	J. H. Blakely.
Montgomery	Sailor's Rest	36 24	10 35	.....	.....	.....	.....	.....	.....	.....	.....	sw.	.....	.....	19	3	9	.....	.....	4	1	.....	.....	.....	.....	7	3.00	John Minor.
Overton	Livingston	36 23	8 17	60	71	59	63	84	9	37	22	sw.	br.	14	8	8	15	.....	11	1	.....	1	.....	.....	3	11	3.03	J. Laughlin.
Polk	Benton, 880 ft	35 10	7 45	60	75	63	66	90	4	41	22	n.	br.	15	11	6	14	.....	19	1	2	.....	.....	.....	3	8	1.93	Jim Hood.
Rutherford	Murfreesboro'	35 40	9 26	63	78	63	68	92	8	42	22	nw.	h.	21	1	10	20	.....	.....	5	1	.....	.....	.....	3	8	5.00	A. Robertson.
Rutherford	Florence Station	35 53	9 26	61	77	64	67	89	9	44	21	se.	br.	14	14	11	6	.....	.....	.....	.....	.....	.....	.....	.....	6	3.41	C. F. Vandeford.
Rhea	Grand View, 1,635 ft	35 45	7 48	59	71	60	62	83	8	33	22	e.	br.	4	20	10	2	19	3	26	3	1	4	1	1	5	8	.....	Hattie R. Stratton.
Smith	Riddleton	36 19	9 07	60	75	68	68	86	2	41	22	sw.	h.	21	11	2	11	.....	.....	4	1	2	3	.....	1	6	.....	S. P. Furgusson.
Smith	Alexandria	35 30	8 56	64	.....	66	65	80	9	40	22	nw.	br.	18	5	2	24	.....	.....	.....	1	.....	.....	.....	.....	7	5.19	Irenus Beckwith.
Tipton	Covington	35 20	12 38	59	74	65	66	85	8	43	22	s.	br.	.....	15	8	8	.....	.....	2	.....	.....	1	...	...	9	5.34	T. W. Roane.
Williamson	Franklin	35 50	9 48	60	74	61	65	84	9	40	22	sw.	h.	20	8	11	12	.....	.....	.....	.....	.....	.....	.....	.....	5	5.12	Samuel Henderson.
Warren	McMinnville	35 45	8 45	65	70	66	67	80	9	40	22	ne.	br.	26	15	.....	13	.....	.....	.....	1	.....	.....	.....	.....	6	0.81	B. W. Sparks.

Mr. A. J. McWhirter, Commissioner of Agriculture, Statistics, and Mines, for Tennessee, in his report for May, 1883, refers to the Weather Service of that state as follows:

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This important branch of the bureau is gradually assuming shape, and will soon prove a valuable part of these monthly reports.

The accompanying report is compiled from observations made at forty-four different stations. The apparent discrepancies in some of those near together are due in a great measure to the difference in the recording instruments. It is to be regretted that some of the observers have not yet been supplied with the proper instruments for accurate observations, but those deficiencies will be supplied as early as possible.

The feature of the weather for the month was the low temperature over the state about the 22d, with snow in some localities, and frost generally.

In some of the reports breaks have appeared in the observations, and it is suggested, that in order to prevent this, and have a complete report for the month, the observers instruct some member of their respective families, or some other suitable person, in the use of the instruments, so that in case of absence or sickness, such breaks may be avoided as far as possible.

ERRATUM.

In the April REVIEW, on page 1, the first three lines under barometric "departures from the normal values for the month," should read as follows:—"On the middle Pacific coast, in New England, the middle Atlantic states, and in the eastern part of the lower lake region, the pressure is *above* the normal," instead of *below* the normal as published. This error was detected and correction made before all copies of the REVIEW were printed, and this note will, therefore, apply only to a part of that issue.

Chart I. Tracks of Low-Barometer Areas. May, 1883.

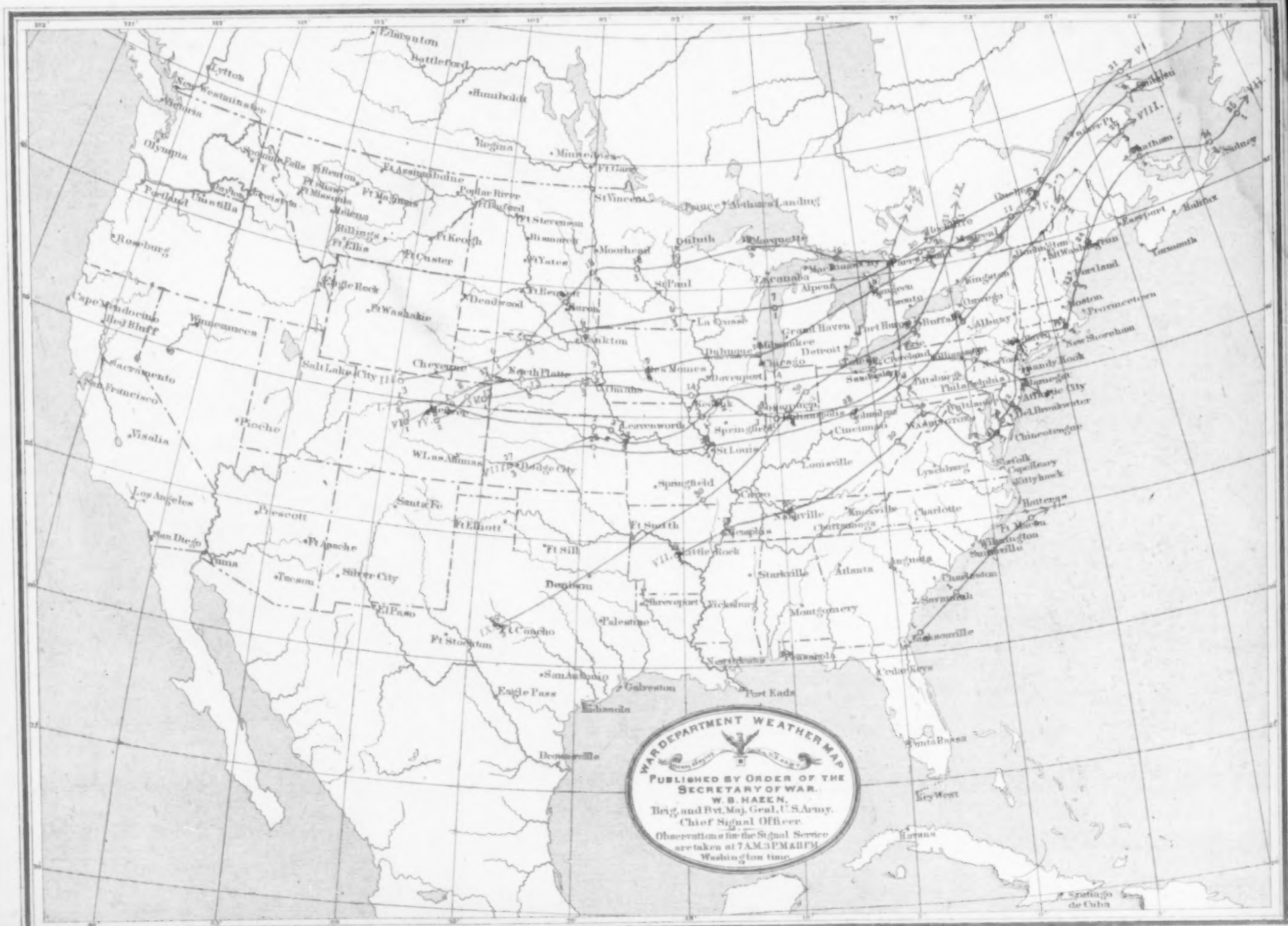


Chart II. Ocean Storm Tracks, May, 1883.

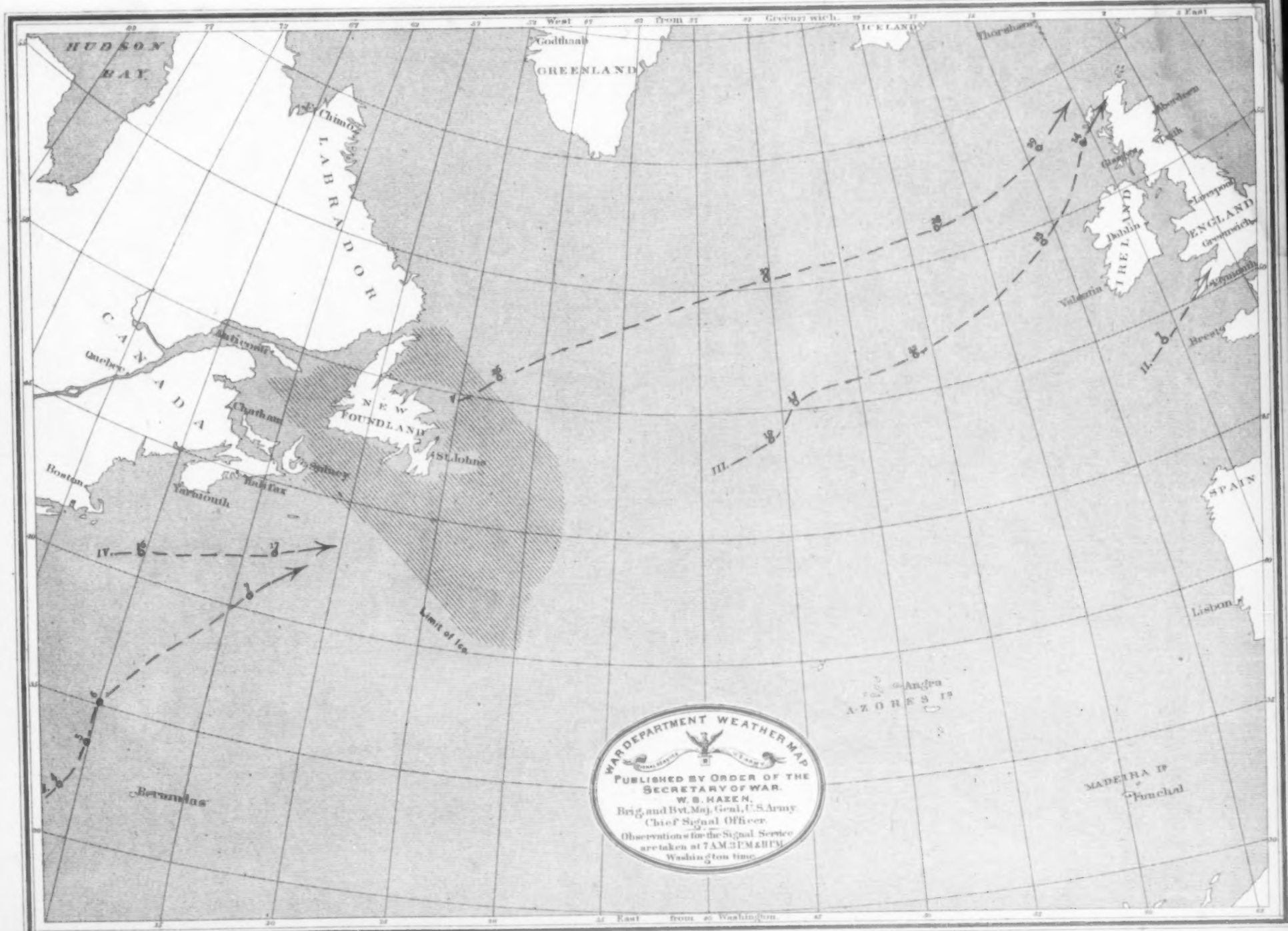


Chart III. Isobars, Isotherms, and Winds. May. 1883.

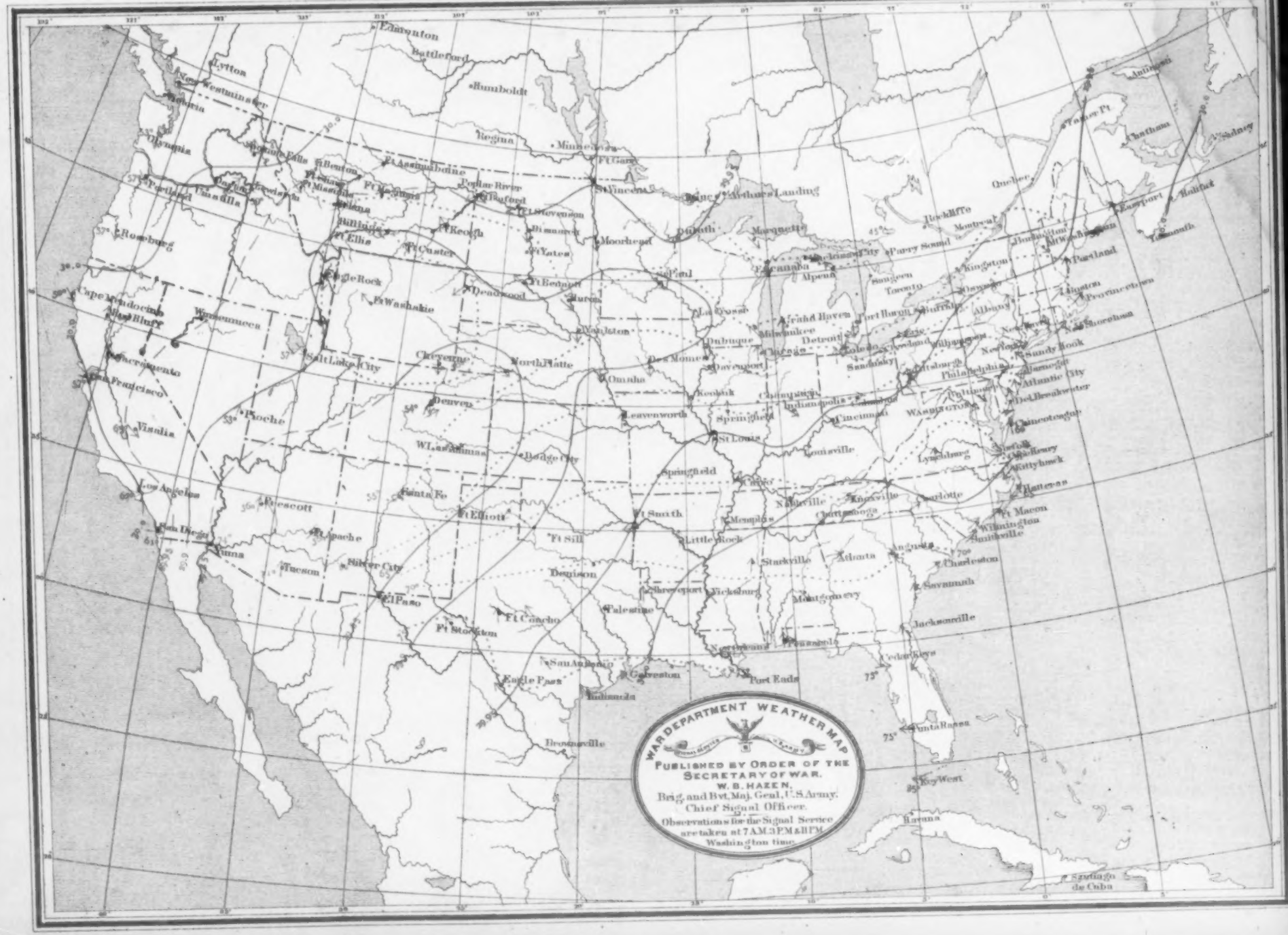
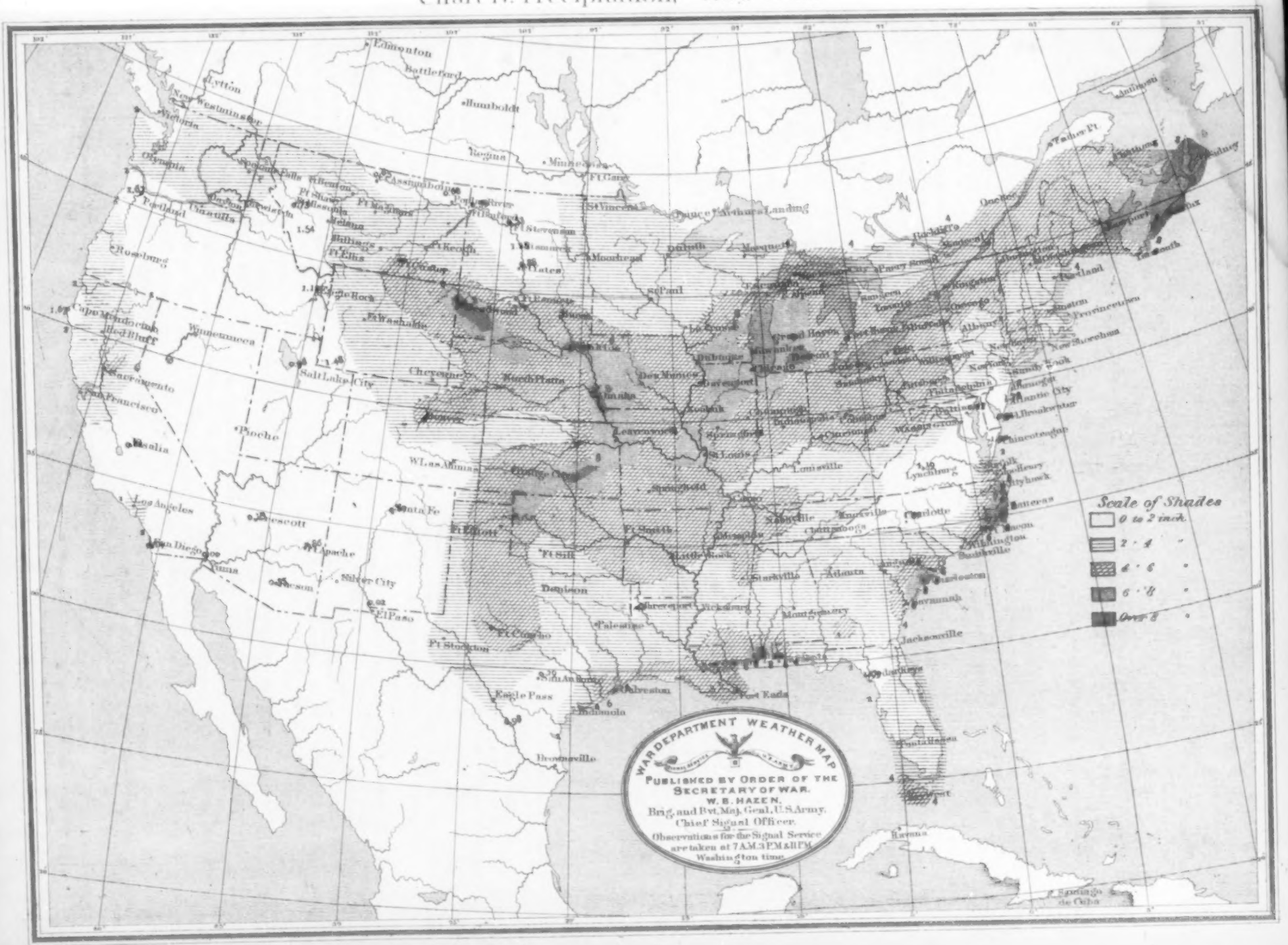

WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. B. HAZEN,
Brig. and Bvt. Maj. Genl. U.S. Army.
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M. Washington time.

Chart IV. Precipitation, May, 1883.


Scale of Shades
0 to 2 inch.
2 · 4 "
4 · 6 "
6 · 8 "
Over 8 "
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